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BRITISH MINERALOGY:

OR

COLOURED FIGURES

INTENDED TO ELUCIDATE

THE MINERALOGY

OF

Great Britain.

BY JAMES SOWERBY, F.L.S.

HONORARY MEMBER OF THE PHYSICAL SOCIETY OF GÖTTINGEN,
DESIGNER OF ENGLISH BOTANY, AUTHOR OF ENGLISH FUNGI, ETC.

(With Assistance.)

As for the Earth, out of it cometh Bread, and under it is turned up as it were Fire. The Stones of it are the Places of Sapphires; and it hath Dust of Gold. JOB xxviii. 5, 6.

VOL. IV.

LONDON:
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MDCCCXI.

301

TAB. CCCI.

CUPRUM sulphureum.

Sulphuret of Copper ; Swimming Pyrites.

Div. 2. Imitative.

It is now no novelty to find Metals of very light specific gravity, since Mr. Davy's discovery of Sodium and Potassium, yet we have no account of Swimming Copper Pyrites, that I know of. I am therefore glad to treat the world with this novelty. Some time ago Mr. Carne favoured me with the Swimming Quartz which had some porous Sulphuret and Oxide of Copper about it, which gave me reason to suppose some Swimming Copper Ore might be found, since which time he has kindly informed me that he has procured a specimen, and I have, by chance, received this from the same place [*].

It would seem from its appearance to have been formed by passing among the irregular interstices of some shattered part of a rock which is completely gone in the same manner as from the Quartz above. It is in somewhat plated chambers irregularly angular of various dimensions. It is extremely friable, and the tenuity of the plates or divisions will scarcely allow of its being handled. It is a kind of exception to the rule by which we judge of the specific gravity or weight of Metals by the hand, to distinguish them from the Combustibles and Earths, and is a good example of an argument regarding the gravitating principle, that, under certain circumstances, the Metals may lie above the Earths and Combustibles, when in a divided state. Thus it is lighter than water in this porous form, although its solid specific gravity in comparison to that of Water is as 4·315 to 1000: so that, in judging of specific gravity, the solid state of the substance must be attended to.

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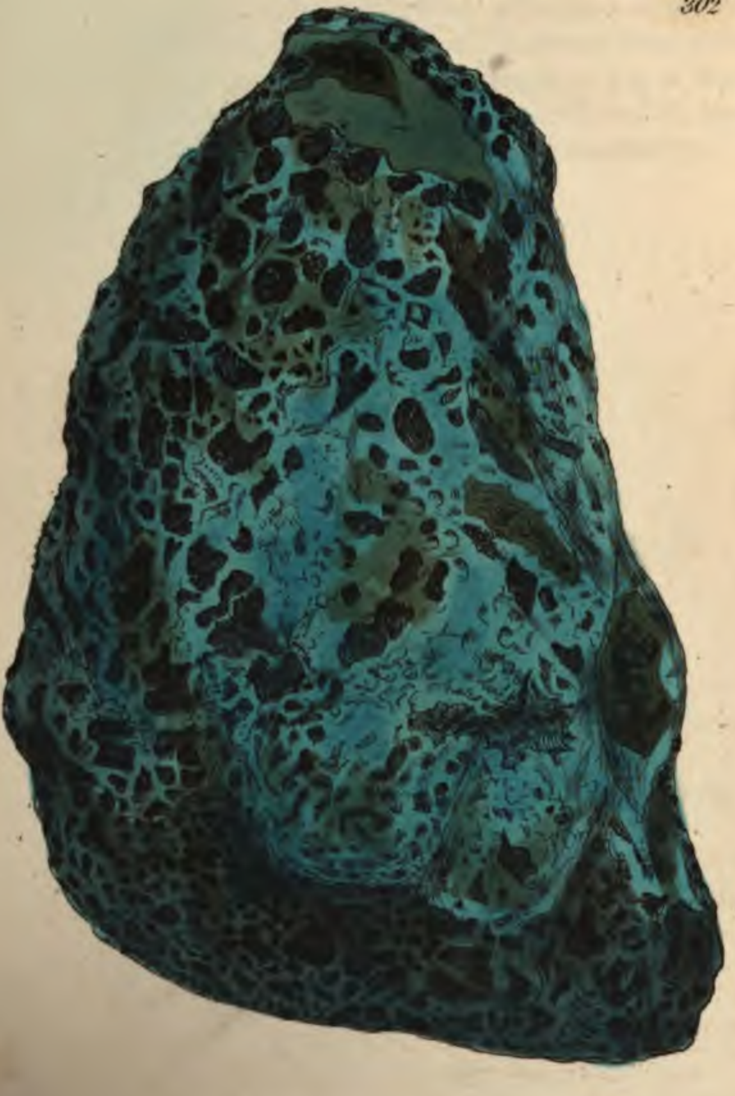
[*] From Trelistian Mine, near Penzance in Cornwall.



Feb. 1. 1821. Publish'd by Jas. Sowerby London

TAB. CCCII.

CUPRUM hyperoxygenizatum.

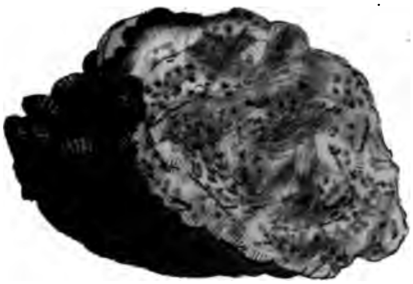
Peroxide or Hydrate of Copper.

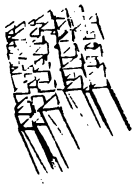
Div. 3. Amorphous.

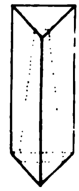
As it is interesting to Geologists to see what substances come together, I figure this variety of Copper Ore mingled with the black Oxide of Manganese in the same bed or part of the vein. It is extremely curious to find it so clean and bright among the loosely cracking, almost powdery Manganese which is so liable to soil any thing near it. Nature, here, however, shows us a striking example of the inseparable connexion between the particles of certain substances, so important to defend us from that chaos which might otherwise ensue.

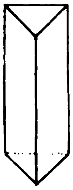
This is a variety of the same Copper Ore as *tabs.* 279 and 280, containing much Silex, and, having most of the different appearances, as to colour, from nearly white to yellower and blueish green, probably depending on the quantity of water it holds. The dark green parts are Carbonate of Copper.

303









Feb.1.1809. Publish'd by Jas Sowerby London.

TAB. CCCIII.

CUPRUM arseniatum.

Arseniate of Copper.

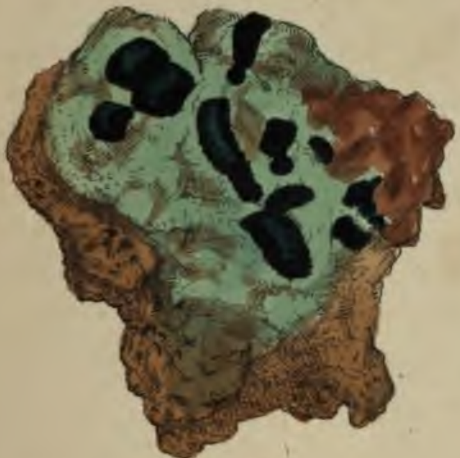
Class 3. Metals. *Order* 1. Homogeneous.
Gen. Copper. *Spec.* Arseniate of.

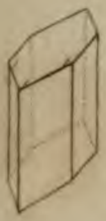
In addition to our former figures of Arseniate of Copper, *tabs.* 168, 169, 170, I am happy to figure these curious varieties, not merely because they are rare, but as examples that are of more consequence, as they will explain many groups of this substance that are scarcely, if at all, understood. The present rotate specimens, if I may so call them, are, as it were, a congeries formed of the truncated triëdral column, chiefly like *the left hand bottom outline.* The other outline shows, by the small dots, that one of the solid angles is sometimes replaced by a new face, which would give it a wedge form, very applicable to the rotate formation of *the upper specimen:* they, however, seem more perfect columns, and are placed among each other somewhat upon the principle of the Galena in *tab.* 131. *The middle outline* shows the columnar sides and the triangular ends, nearly as they appear when magnified. Some are very small, and others larger and more irregular, somewhat approaching the broad faces, and even the mackles, as in *the next figure.*

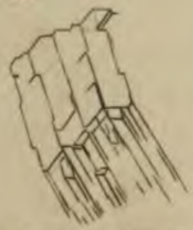
TAB. CCCIV.

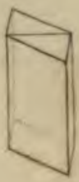
At first sight this looks like a very different modification from the last. It is, however, only more perfectly accumulated on the periphery of a wheel, as it were, united in large faces, either upon opposite ends of crystals, like *the right hand lower figure,* or mackle, and is sometimes formed of a variety composed of many, partly belonging to *the left hand bottom figure.* The ends become small and rough around the series of *tab.* 303, but large and smooth around this; whilst, on the contrary, the radii of the latter or column are generally most confused.

304









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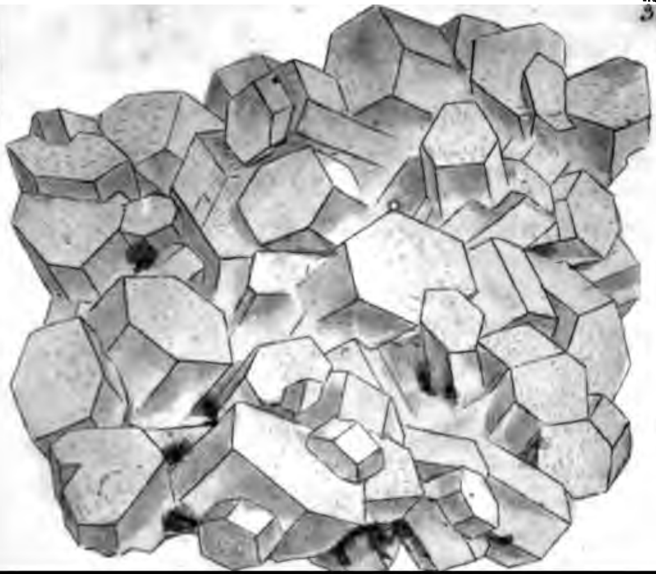


TAB. CCCV.

CALX carbonata.

Crystallized Carbonate of Lime.

Class 2. Earths. *Order* 1. Homogeneous.
Gen. Calx. *Spec.* Carbonata.
Div. 1. Crystallized. *Var.* Hexaëdral Prisms.

Syn. Chaux carbonatée prismatique. *Haüy*, 2. 141.

The simple hexaëdral column is among the scarcer forms of this substance in Britain.

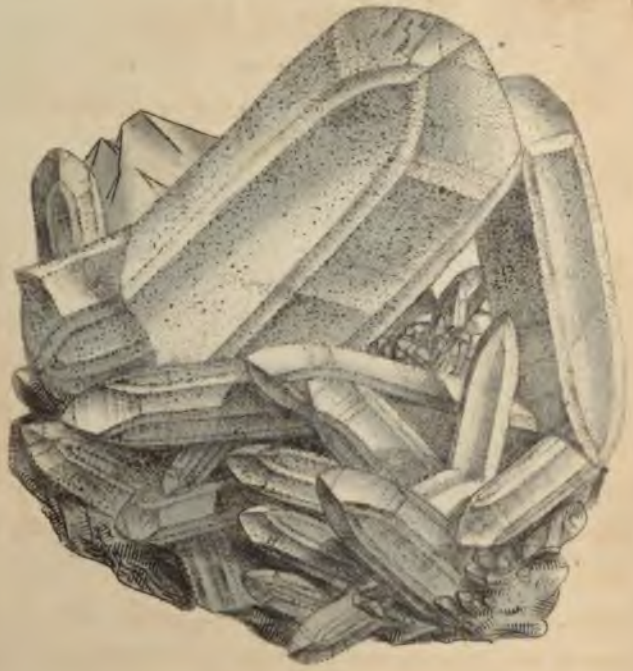
The present specimens came from Cumberland. Crystals of this form more rarely occur in Derbyshire. In Scotland they are found at Strontian with Stilbite on the opposite side of the specimen, as figured at *tab.* 258. In some instances the whole form of the crystals is very neat, and every face is polished.

The upper specimen has not the end face polished, but roughish.

The lower specimen is most extraordinary, as on it the crystals have very short columns and lie in various directions, having both ends opaque, but are smooth and polished on all the faces. The cause of polished faces might seem to depend upon the gradual separation of the menstruum or solvent from which it crystallized; and a great quantity might, by suddenly passing off, leave the terminations of the crystals rough as in *the upper specimens*, which are not finished at both ends; *the lower crystals* probably derive their opacity from a scanty supply of water of crystallization at the ends.

Some of the crystals in *the upper specimen* have the terminal edges bevilled towards the column which leads to other formations—see *the next figure.*

306



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TAB. CCCVI.

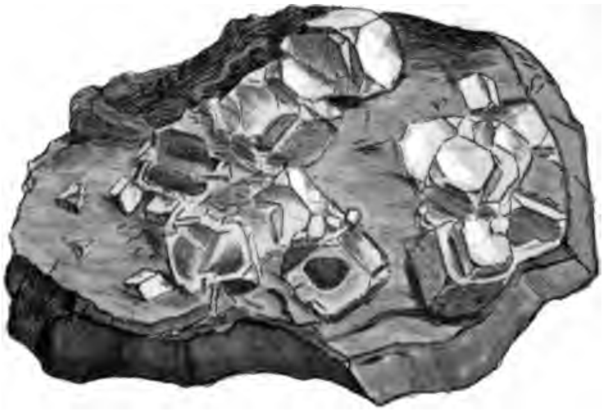
CALX carbonata.

Carbonate of Lime.

Class 2. Earths. *Order* 1. Homogeneous.
Gen. Calx *Spec.* Carbonata.
Div. 1. Crystallized. *Var.*

The present modification is far from common, and has so peculiar an appearance that it must attract the observation of the enlightened enquirer, showing how infinitely various may be the modifications of this substance. The edges of the three sides of the column are rounded by repeated facets on that and on the pyramid, and the other three sides of the column are bevilled laterally towards the former three, making with them and the pyramid a figure like the front of a Gothic arch. The thickness of the column, and depth in the proportions of the flatter, or rounding, facets, give this a variable appearance. The pyramidal ends are often distinct, and nearly correspond with the primitive rhomb.

307



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TAB. CCCVII.

SILEX Quartzum, *var.*
Octaëdral Calcedony.

Class 2. Earths. *Order* 1. Homogeneous.
Gen. 4. Silex. *Spec.* Quartzum.
Div. 2. Imitative. *Var.* Octaëdral.

Syn. Quartz Agathe. *Haüy,* 2. 424.

I was favoured with this fine specimen by Lord Heathfield, who sent it from Beer Alstone in Devonshire. It is a secondary crystallization, having taken the form of some other substance that was prior to it. It has here taken the place of Fluor or Galæna, most probably Fluor somewhat like that of *tab.* 26. Some of the casts are extremely neat, others are somewhat hollow, and have Quartz crystals within them.

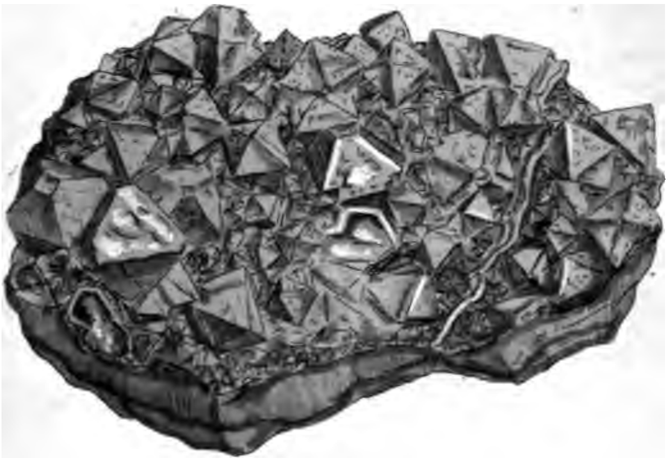
TAB. CCCVIII.

Cubic Calcedony.

This is commonly called Cubic Hornstone, but is truly a Calcedony, as indeed are many things which are commonly called Hornstone, and it is hard to show their distinguishing characters. This specimen came from Beer Alstone, where the curious Octaëdral Fluor is found on what is also called Hornstone—see *tab.* 26. The crystals are generally blunt edged, their solid angles truncated, and their surfaces minutely mamillated, which helps to distinguish them. This secondary crystallization almost exclusively belongs to this substance, although there are one or two instances of its being found in other substances, as in Steatite, but which is chiefly in the form of Quartz. All are scarce.

The name Hornstone I suppose to be taken from the resemblance the stone bears to horn; a great variety of stones have occasionally had that appellation given to them, which probably vary much in their ingredients, as some little mixture may help their appearance: thus we might possibly find Lime, Fluor, and Clay Hornstones.

308



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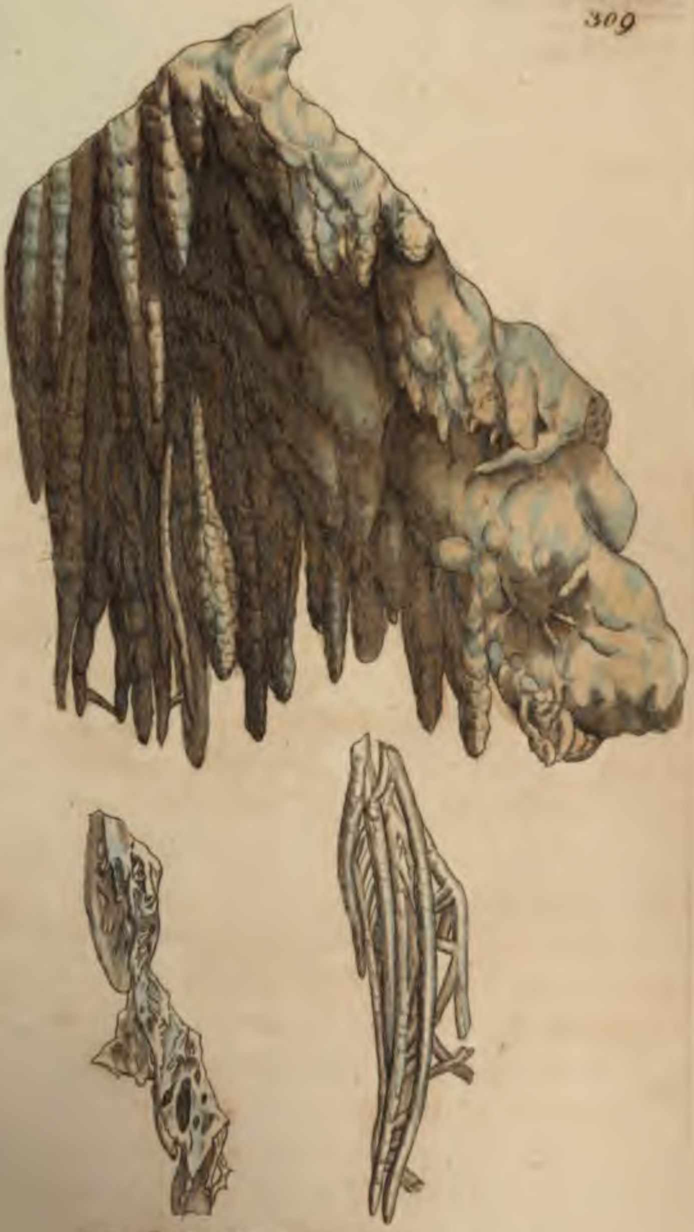

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TAB. CCCIX.

SILEX Quartzum, *var.* Stalactites.

Stalactitical Calcedony.

Div. 2. Imitative. *Var.* Stalactitical.

Syn. Quartz Agathe. *Haüy*, 2. 424.

Trevascus in Cornwall has afforded the finest examples of this peculiar Stalactitical Calcedony. My liberal friends the Hon. Charles Greville, Philip Rashleigh, Esq. and Mr. Richard Phillips can show truly magnificent specimens, above a foot in diameter in some parts, and of every varied form, including the following examples.

The upper figure serves to express the more usual stalactitical formation, and the somewhat undulating mamillated appearance common to Calcedony, besides the blunt, heavy, and inosculating varieties.

The lower figures show what is commonly called Bony Calcedony, and have some of the usual appearances accompanied by the more unusual ones of slender thready plates, forming the foraminous appearances which discover to us something more than what is merely stalactitical, and peculiar to the substance itself; probably depending on the nature of the solution, like most Flints and flinty substances; but it never crystallizes as they do, having that appearance only because it has been cast into the places where crystals have been.

TAB. CCCX.

SILEX Quartzum, *var.*

Shell-formed Calcedony.

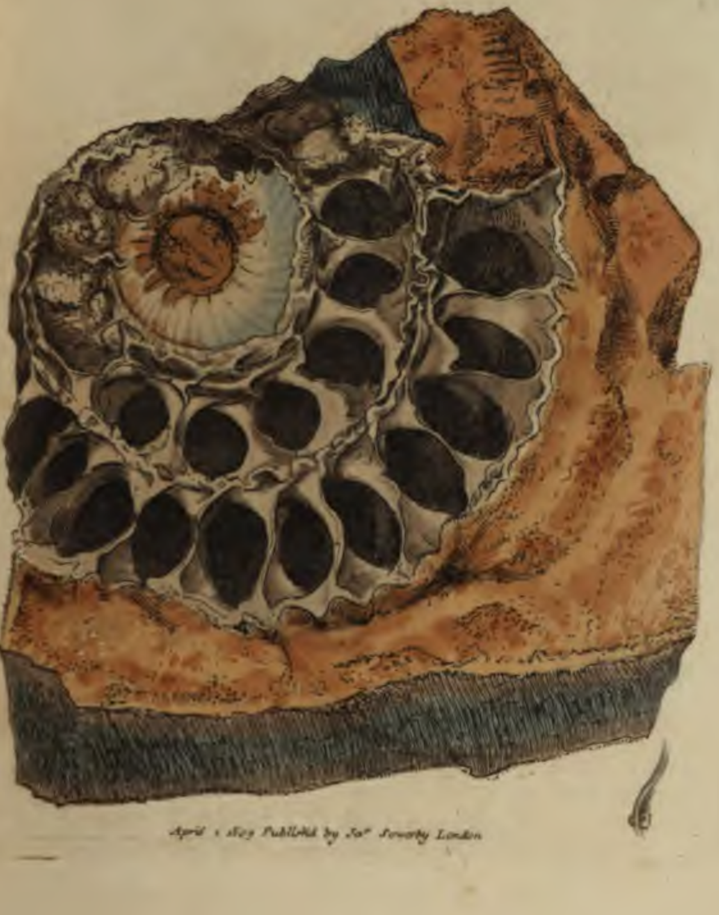
Div. 2. Imitative. *Var.* Shell-like.

I AM obliged to the generosity of Mr. Milne of Fonthill for this specimen. That place and the neighbourhood often afford Cornua Ammonis of very extraordinary dimensions. I was told of one that was at Tisbury nearly as big as the large wheel of a coach. I have one of 21 inches in diameter, and my friend Mr. W. Cunnington has one larger. They are often of Sandy Limestone, or Limestone with crystals within, and now and then there are found the remains of similar shells in Flint with the chambered divisions partly calcedonized, if I may use the expression, and containing Quartz crystals; but the most curious specimen ever seen is the present, except one as nearly like it as possible, which I am told is in the possession of Sir Edward Hulse of Salisbury. It is perhaps as extraordinary a geological specimen as any that have been seen. The mass is chiefly Flint; but the shell has been lined, and having subsequently decayed, left the Calcedony of the most delicate and exquisite structure. The peculiarly regular folding manner of the divisions, and their uniformity, are no where disturbed. The Calcedony is placed distinctly around where the shell originally was. There are other minute shells about the specimen, and also some Carbonate of Lime, both crystallized and amorphous.

The lower figure exhibits one of the partitions, showing the tube which passes round the shell, different from what is usual, as not being a continued channel, but divided into short tubes, each of which communicates by its openings with two chambers.

Geologists, as they contemplate the changes which have here taken place, may well join with David, Linneus, and all true philosophers, in exclaiming, "Oh! JEHOVAH, great and manifold are thy works; in wisdom hast thou made them all; the Earth is full of thy riches."

Sir H. C. Englefield showed me a beautiful specimen of a spiral shell with the end passing from Calcedony to Opal.



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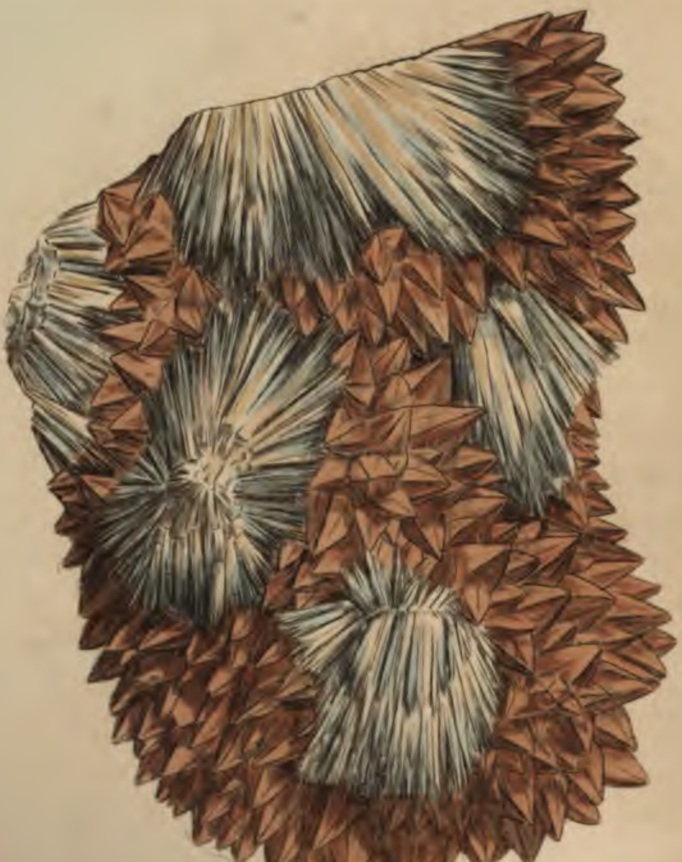

April 1 1809 Published by Jas Sowerby London

TAB. CCCXI.

STRONTIA sulphata.

Stellated or radiated Sulphate of Strontian.

Div. 2. Imitative.

This elegant variety of Sulphate of Strontian was found in sinking a foundation for buildings at Bristol. I do not know that such has been met with elsewhere. Besides these stellated ones, there were many very beautifully spiculated. The noble appearance of this, relieved so conspicuously, being formed over Metastatic Carbonate of Lime, enhances its curiosity. The stellæ or radii so much represent those in general executed by sculptors, that we might imagine they had had some such an original to imitate; and as, I believe, they borrow from antiquity, so I should imagine the antique models are borrowed from something in Nature, which indicates that the ancients were not only capable of taking a proper advantage of what was useful or instructive to them, but that they probably paid much attention to such subjects, and were not at a loss for originals to facilitate their study, and help their inventions.

This substance is described at *tab.* 117, and in form much resembles the Lepastrum or Stellated Sulphate of Barytes—see *tab.* 173.

TAB. CCCXII.

STRONTIA sulphata.

Brush-like Sulphate of Strontian.

Brush Iron Ore is spoken of in many authors, but I do not know of any mention having been made of Sulphate of Strontian in that form. The specimen here figured, however, is so perfectly described by that appellation, that very few will not assent to it. It came from the same place as the last, and is formed altogether of smaller spiculæ. The bundled and, sometimes, twisted elongated arrangement admits of not only a picturesque effect, but exhibits the pleasing graceful line of beauty so universally attractive in Nature, that, ever since our Hogarth observed it, we may be said to have been indulged with a new sense for abstract beauty.

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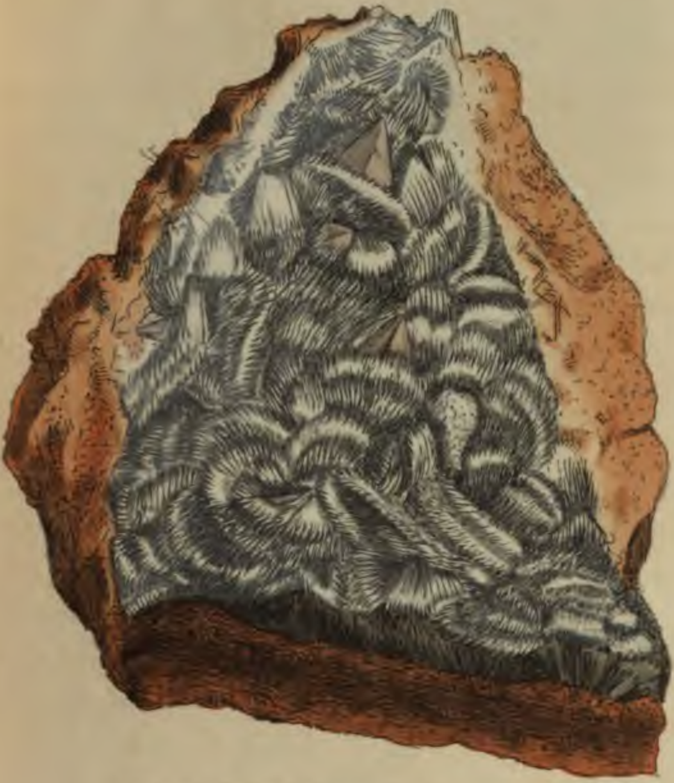
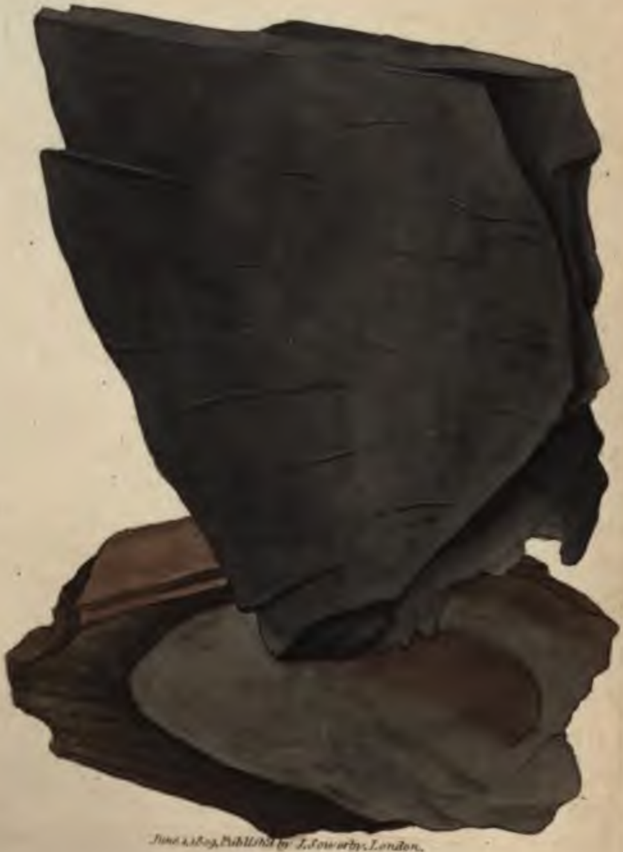


April 1 1809 Publish'd by Jas Sowerby London



June 1,1809, Published by J. Sowerby, London.

TAB. CCCXIII.

CARBON vegeto-bituminosus.
Vegetable Coal.

Class 1. Combustibles.	*Order* 2. Compound.
Gen. 5. Carbon.	*Spec.* 2. Combined with bitumen and a small portion of vegetable matter.

Div. 2. Amorphous.

Syn. Bituminous Schistus. *Hatchett in Linn. Trans.* 4. 136.

Kimmeridge Coal, as spoken of by Mineralogists, is nevertheless not very generally known, nor would the substance, if found in any other place, from its aspect, be suspected as a Coal, and therefore has been casually overlooked by those who wanted specimens. It varies somewhat in appearance, as it sometimes divides with a very regular schistose fracture, and it is at other times more massive and earthy. The same is found a little above the level of the sea on the eastern side of Portland Island, as well as at Swanage in Dorsetshire, where it is met with at the same level. It is used at Swanage, and in some parts of Portland, for heating ovens; and although the Bitumen gives an uncomfortable odour if burned in a common fire, it does not, I am told, give any effluvia to affect the bread in the oven.

It may be known by its lightness, and taking an easy gloss with rubbing the nail over it; but more particularly by its strong blaze in a common fire. It is sometimes sold for a guinea per ton, and is often in large broad masses, three or four feet in diameter. It is also sometimes dug from the rock with a clay shovel.

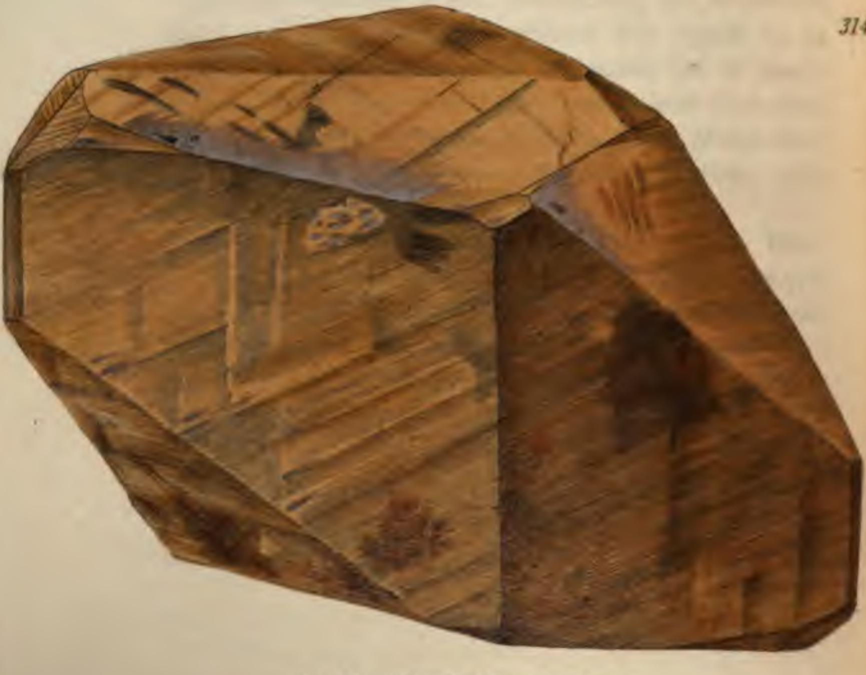
The upper specimen is somewhat slaty in fracture, though rather more earthy. It is a softish clayey Shale with much Petroleum, and emits the smell peculiar to the latter substance when heated.

The lower specimen is still more earthy, but somewhat fissile, and is, as it were, interrupted with regard to its parallels by partly curving round an irregular ball of earthy Pyrites. It is a curious specimen;—sometimes Carbonate of Lime or Chalk intervenes, which is soft. Many other varieties occur, some of which are more slaty, some more earthy, and others of different colours.

The Isle of Wight, opposite Alum Bay, affords Bituminous Carbon in great variety. My kind friend Mr. Lyell favoured me with some that seems to point out the progress of the Bitumen passing from the vegetables and impregnating the substances near them. Lincolnshire affords a similar substance, with Lime of shells remaining betwixt the laminæ. I have some sent me by the Rev. R. B. Francis.

A mixture of Bitumen with Lime, Clay, &c. is sometimes found in Essex, nearly resembling this. I have been favoured with it by Colonel Walford.

314



Apr. 1, 1809 Published by J. Sowerby, Mead Place.

TAB. CCCXIV.

CALX carbonata, *var.* metastatica.

Metastatic crystallized Carbonate of Lime.

Div. 1. Crystallized.

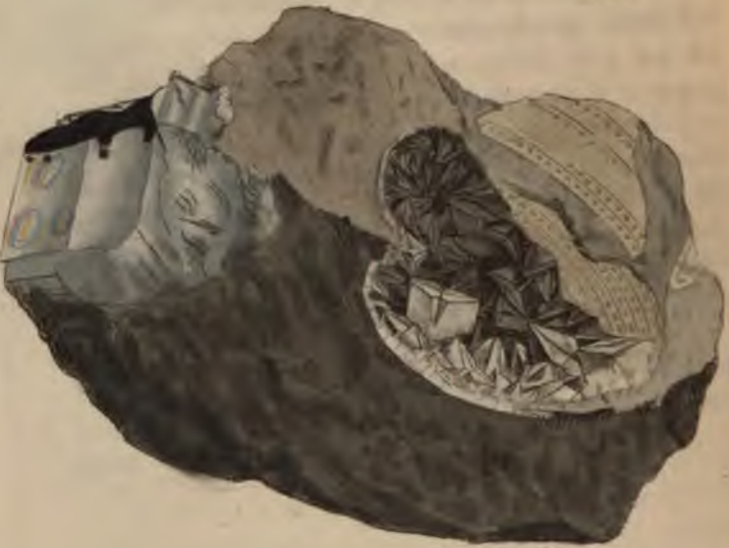
This noble specimen of crystallized Carbonate of Lime is curious, as a variety leading to a kind of Mackle that does not seem to have been suspected; but is not rare as to its formation, for we often see ordinary specimens that partake of it, having two of the opposite faces of each pyramid much widened, forming a base to each parallel to the edge of the primitive nucleus: this will be seen in the next figure, which may be compared with *tab.* 33, the usual Metastatic Mackle. *The two facets, fig.* 1, are primitive, and *fig.* 2 are the same as those of *tab.* 34, *lower figure*, equiaxed; but having those very obtuse-angled faces that so often produce a rounding form, which help so much in the numerous varieties of crystals in this substance, and are extremely curious. *Fig.* 3 is a somewhat rounded edge nearly on the angle of the pyramid. *The facets, fig.* 4, and that opposite, are of the hexaëdral column. *Fig.* 5, a facet nearly on the edge of the nucleus.

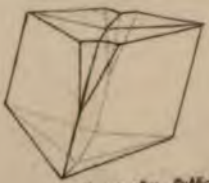
The rounded facets in Crystals are sometimes very deceiving; and the comparing this with the next plate will prove the necessity of this leading specimen, which shows the dividing angle of the natural face of the pyramids parallel with the primitive edge, that divides the two primitive facets at 1. 1. A little rounding face on the acute angles of the broader planes of the pyramid towards the facets of the prism, *fig.* 4, alters the parallelism of the edges, so that by turning round the two halves, as in the next *figure*, is formed the puzzling appearance so proper to be cleared up, on account of being totally new in Crystallography, and extremely curious.

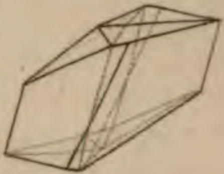
This noble, beautiful, and singular Crystal is from Derbyshire, and is so suitable to precede the next *figure*, that I thought it quite proper to place it here, though indeed it is only the metastatic formation, as in *tab.* 85; but the breadth of two of the faces would disguise it to many, and more so if mackled as in the next *figures*, with the two faces still broader, and which this happily serves so clearly to elucidate, and, by the illinitions of the fractures, helps to point out the mutual base of the mackling parts; which is, I believe, both new and extraordinary, as it coincides with a plane drawn through the longer diagonal of the primitive rhomb.

Its colour seems clearly to depend upon the Oxide of Iron, which is partly mixed and partly chemically combined.

315







June 1 1809 Publish'd by Jas Sowerby London

TAB. CCCXV.

THE present curious production is one of those things that few can expect to possess; therefore it is, like many others in this work, a pleasant proof of the utility of figures, which is certainly next to the possession of the object, as to the instructive information it gives, and the making public those beauties of Nature that must otherwise be ever lost to the scientific world.

I do not know that this formed Crystal has yet been spoken of: Romé De Lisle and Haüy do not mention it. It is in the shelly Limestone which forms one of the upper strata of Derbyshire that this has been formed, hid from mortal ken, within one of the most remarkable species of shells I ever knew, *Conchyliolythus productus* of Mr. Martyn's most ingenious work, *plate* 22. *f.* 1, 2, 3.

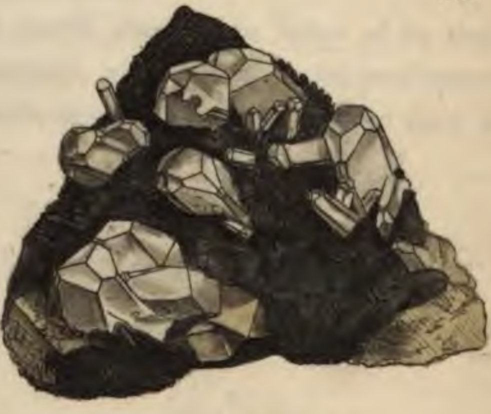
The reason why the primitive molecules should so form, remains a desideratum. We have but just got a notion of the subject, but diligence in this discovering age may yet learn more of Nature's ways, and even this may be the leading cause: the equally contrariwise attraction of the particles may be governed by the equal evaporation of the fluid in contrary directions, and the gravitation of the solvent medium may poise them to that angle which so nicely replaces them.

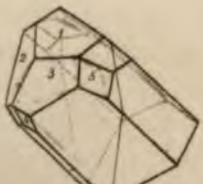
One great curiosity of this Mackle is, that the lateral notch at the junction of the two halves at the upper end of the column is very deceiving, being formed from somewhat rounding facets, often scarcely discernible, but by these means become more conspicuous—see *the last description.*

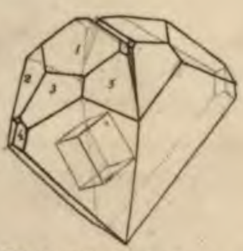
This specimen was lent me by my friend Mr. Lowry, who met with it last summer, and first discovered this remarkable Mackle.

It is prettily placed in the hollow of the shell among the Limestone, which has on the left hand somewhat enveloped the mineral pith, and crystallized about the bubbles.

316







June 1 1809 Publish'd by Jas Sowerby London

TAB. CCCXVI.

CALX carbonata, *var.*

Carbonate of Lime.

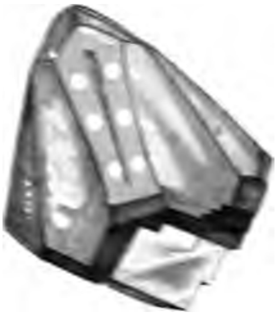
Div. 1. Crystallized.

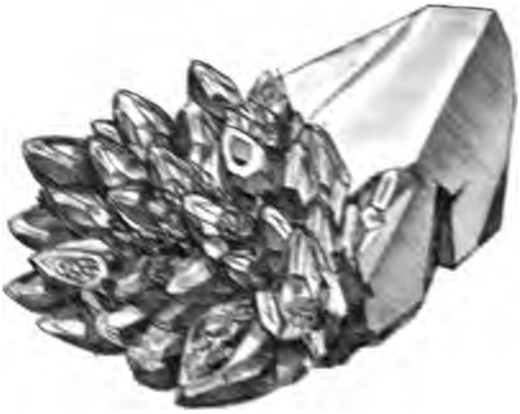
SYN. Chaux carb. analogique. *Haüy*, 2. 252.

COMMON things are often esteemed by common persons because they look brilliant, and Quartz and Mundic have been thus vulgarly called Diamonds; and Diamonds in themselves of real value, in rude fragments, without a proper knowledge, might be cast away as rubbish. It is so lately that the instructive lessons of Nature have been consulted on the useful and elegant study of Mineralogy, that those who have taken advantage of this growing knowledge only know the benefit of it; they can appreciate what is to be esteemed valuable; they enjoy that eminence that sanctions a due value on what is most explanatory of true science.

The present specimen is very rare and valuable; it shows that the attraction that brings two crystals regularly together is confined to one particular side, and not disposed around the apex of the nucleus, as in the common Mackles; and it is new, as it is connected with the columnar modification; for we do not know that the columnar crystals of Carbonate of Lime have been mentioned as mackled in any publication before, except the Count de Bournon's elaborate Treatise, *plate* 24, *fig.* 388.

Mr. Hewland, who possesses this crystal, sets an additional value upon it, as it was a favourite of his late uncle Mr. Forster, and was given him by the late Right Hon. Charles Greville, in whose collection is the only one known besides. It was an unfortunate jealousy in Romé de Lisle that hindered its being published long since in his work as an extraordinary production. I hope such pitiful jealousy will no longer be an obstacle to the elucidation of science.





[illegible] Published by J. Sowerby, Mead Place.

TAB. CCCXVII.

CALX carbonata.

Carbonate of Lime.

Div. 1. Crystallized.

MINERALOGICAL Nomenclators have given titles to crystals under various circumstances, such as Mackles or Twins; and I have exhibited crystals upon crystals which might have some corresponding or expressive term. The present is peculiar as to its structure, and is as it were seamed, and although now perhaps newly noticed, is certainly of as much consequence as many others, especially as it will furnish two very instructive and useful examples in Crystallography, which captivates the fancy so many ways. Here is a half of the Metastatic* Crystal covered on the three obtuse angles of the pyramids by a thick coat spreading on either side, till it meets nearly on the acute angles, forming upon them a plane with a line or seam in the middle of it, which makes the modification more conspicuous, at the same time it is helped by a difference in the inner crystal, which is somewhat more opaque and whiter than the outer covering; and in many lights we see the white reflection between the two surfaces. The three varied quadrangular faces are belonging to the common prism of this substance; those with the seams form somewhat rounding curved truncations to the three solid angles of the pyramid; the terminal faces are those of the equiaxe and primitive.

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* Metastatic means the transposition that happens of the angles of the nucleus on to the secondary crystal.

The lower is a group of nearly the same nature with the seams, if I may so call them, more closed, except in some places where there are small crystals formed, so as to appear as if bursting out of the cover, on which the pyramids rest, or from which they are a continuation.

The lower part of the upper figure has the nucleus very distinctly in its place, and the diagonal fracture is very distinct, and serves to show the base of the pyramid. The Earl of Dartmouth brought me some opaque Limestone from Lord Dudley's mine with these fractures very distinct.

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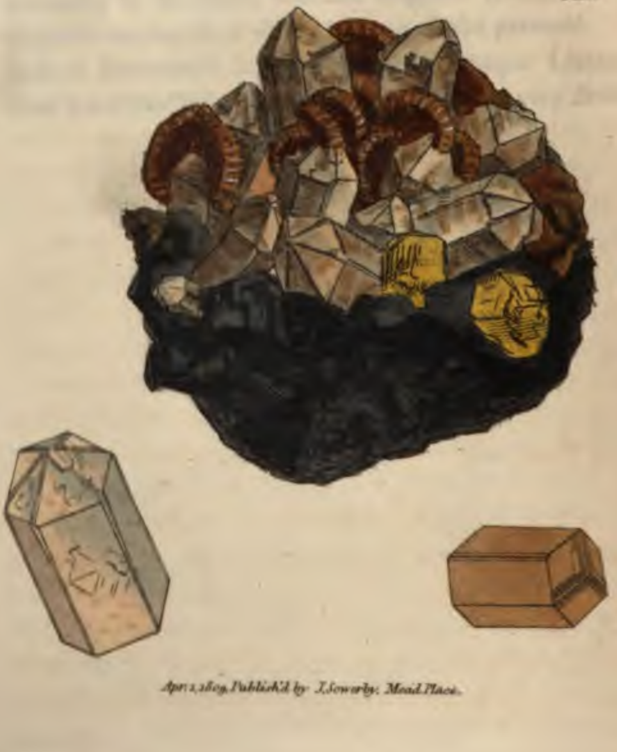


Apr. 1, 1809, Publish'd by J. Sowerby, Mead Place.

TAB. CCCXVIII.

SILEX Quartzum, cryst.

Crystallized Quartz.

Div. 1. Crystallized.

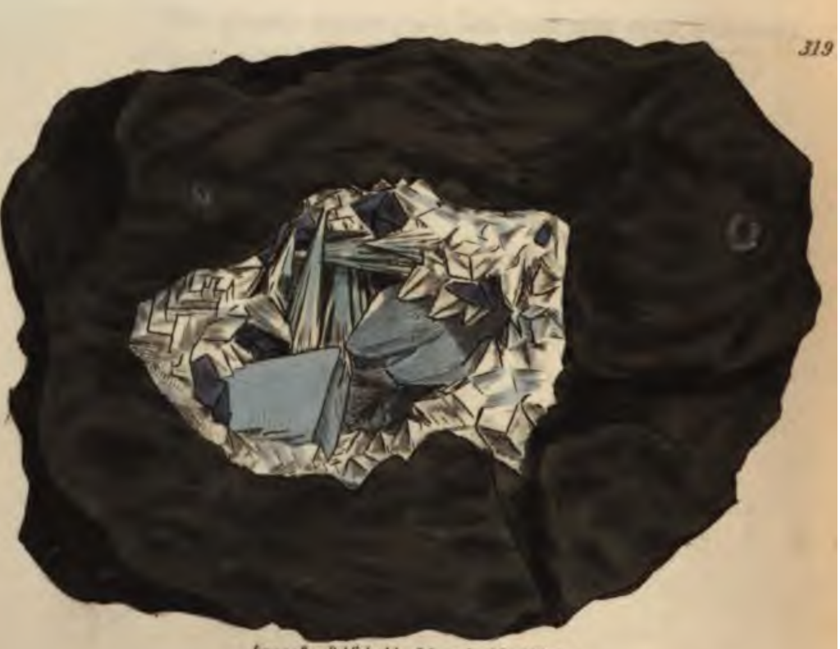
I PLACE this as a most curious example of Quartz new to the mineralogical writers, the six vertical edges of the columns of the crystals being truncated, doubling the number of the faces, as well as those of the pyramid, which also show the manner of the nuclei accumulating to form various sportive modifications; and some of these plates meeting in seams, as I have called them, *tab.* 317, distinctly show their nature. Another curiosity attached to this group is a rotate accumulation of the columnar garnet-formed Carbonate of Lime, or perhaps Magnesian Pearly Spar.

Dr. Turton has long deserved my best acknowledgements, as well as those of the public, not only for his literary talents in the translation of *Linnæus's Systema Naturæ*, but in his other endeavours to assist in the general knowledge of Natural History; nor does he omit to collect specimens that are useful to those engaged in pourtraying any particular branch. Among many other kindnesses I am glad to acknowledge the present most valuable specimen, for its novelty and very instructive formation. I should think it were a loss to the public, in a work that is to serve in many instances instead of an expensive cabinet, to omit the whole specimen, although more really valuable than glaring; and besides, a book of crystals merely cannot be so valuable, and can convey no idea of the specimen it was taken from, and which it ought to elucidate.

The right hand middle figure shows the Quartz crystal magnified, and *the left hand one* shows a crystal detatched from the group of Garnet-like crystals of Carbonate of Lime.

The Quartz is extremely rich externally with iridescent colours; but this is lost in smallness.

319



June 1, 1809 Published by J. Sowerby Mead Place.

TAB. CCCXIX.

STRONTIA sulphata.

Stellated Sulphate of Strontia.

Div. 2. Imitative.

THIS is rather a geological specimen, and may be useful as an example of the black rock of Bristol, with the hollow showing Carbonate of Lime, Fluate of Lime, and Sulphate of Strontian, and the rocky mass or gangue is in this instance of the same formation as that of Derbyshire, dark Limestone, and like that is a variety of Stinkstein holding entrochi, shells, &c., as the present specimen does: it is also analogous to that of Ireland. Having thought it more essential to figure the substances, that they may be known first, it may be presumed I need but in a few instances repeat them in the form of rocks, as the gangue in many instances, or the whole in some, form the rocks already, as the Micas and Feldspars in Granite; the Analcime, &c. in other rocks.

I was favoured with this specimen by Mr. Herbert, a very ingenious collector, of Bristol.

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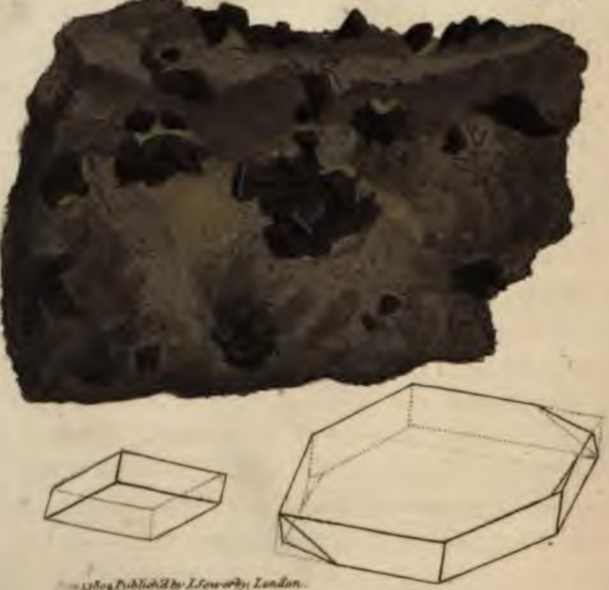


[illegible] 1.1809 Publish'd by J. Sowerby, London.

TAB. CCCXX.

SILEX axinimorphum.

Violet Schorl, or Thumerstone.

Class 2.	Earths.	*Order* 1.	Homogeneous.
Gen.	Silex.	*Spec.*	Thumerstone.

SYN. Schorl violet. *Journ. de Physique*, 1785, Janv. p. 66.
Schorl transparent lenticulaire. *De Lisle*, 2. 353.
Yanolithe. *Lametherie*, *Sciagr.* 1. 287.
La Pierre de Thum, ou Le Thumerstein. *Broch.* 1. 236.
Thumerstone. *Kirw.* 1. 273.
Axinite. *Haüy*, 3. 22. *Karst.* p. 22.

I DO not know of this substance being found in Great Britain, excepting in the parish of St. Just in Cornwall. It is found in many places abroad, as in Siberia, Norway, Dauphiny, and at Thum in Saxony, whence its name Thumerstein, it having been first discovered at that place.

We find it crystallized in very oblique rhombs—see *the right hand lower figure.* Its primitive is a rhomboidal prism, similar to that of the Sulphate of Barytes—see *the left hand figure.* It is mostly of a dull purplish colour, whence its name Violet Schorl; though it is sometimes blueish, brownish, or grayish.

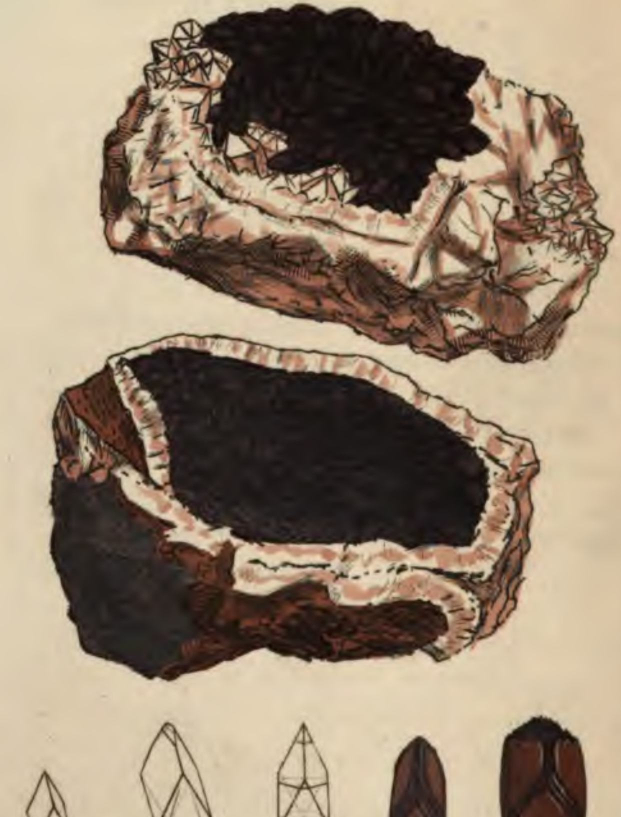
In all the British specimens the crystals are confusedly grouped and small, the foreign ones being often as large as the geometrical outlines. The fracture is small, rather irregularly conchoidal, and has a glassy appearance. Thumerstone is more or less transparent, breaks easily, is rather brittle, may be scratched with difficulty by a knife, and melts easily without addition by the blowpipe into a lightish green glass. *Spec. Grav.* 3·113—3·300.

Analysis by Vauquelin :

Silex	44
Alumine	18
Lime	19
Oxide of Iron . . .	14
Oxide of Manganese .	4
Loss	1
	100

The crystals are found in hollows in an earthy matrix of itself, often having a fine Asbestus covering them which looks like Clay, but may be easily detected by being wetted, as it is composed of extremely fine fibres. I find also some crystallized Carbonate of Lime with the rhombic fracture.

I am obliged to Mr. Penneck, Mr. Trevillian, and Mr. Rashley, for specimens.



Aug. 1, 1809 Published by J. Sowerby, Mead Place.

TAB. CCCXXI.

CALX carbonata, *var.* magnesiata.

Magnesian Carbonate of Lime with Iron.

Div. 1. Crystallized.

SYN. Sidero-Calcite. *Kirw.* 1. 105.

THIS curious Mineral was long since in Mr. W. Day's collection, and I have had specimens sent me by P. Rashleigh, Esq. from Tincroft in the parish of St. John, Cornwall, as well as by another friend from that neighbourhood. All are related to each other in the form of their crystals, and instruct us in a series of modifications upon an acute rhomb; showing some very distinctly, and the manner of accumulation necessary to form others: a very natural lesson in Crystallography. In *the upper figure* are some minute perfect rhombs, resembling Haüy's *contrastante var.* of Carbonate of Lime—see *the bottom left hand figure;* while others are larger with the three faces of the primitive remaining on the acute points or pyramids.

The middle figure shows a small truncation on the apex of the rhomb, forming a triangular facet, which in some Crystals is enlarged so as to cut off the obtuse lateral angles, thus producing hexangular faces at each end. *The next magnified figure to that on the right hand* shows an accumulation of flat or plated rhombs, forming truncations upon all the edges. *The other figure* shows them produced very widely, with the sharper angles accumulating in a triangle at both ends. This is exemplified in the lower part of the specimen *fig.* 2. The Crystal in *the middle geometrical figure* is also on a large specimen that was in Mr. W. Day's collection.

This is the Braunspath of the Germans; but has, however, been sometimes taken for a Tin Ore in Cornwall.

Mr. W. Day observed that it did not effervesce with acids. It is one of its characters, as a Magnesian Iron Ore, to effervesce very slowly.

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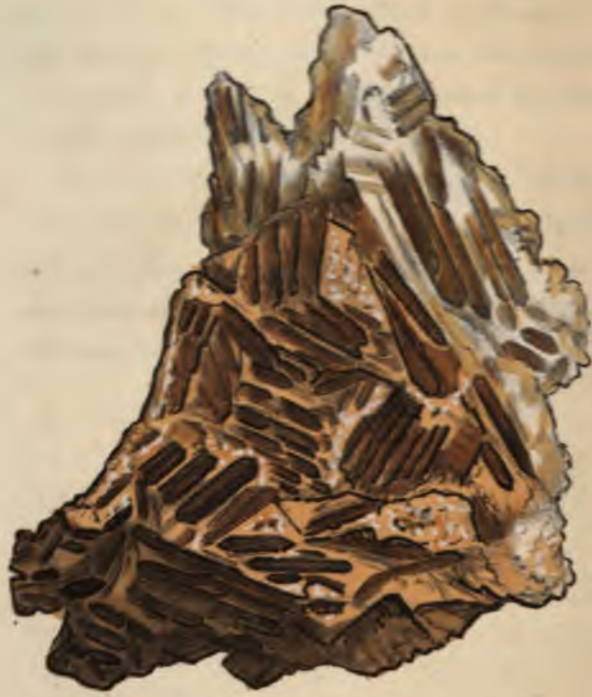

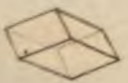

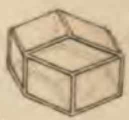

May 1 1809 published by Jas. Sowerby London.

TAB. CCCXXII.

CALX carbonata, *var.* dodecaëdra.

Dodecaëdral Carbonate of Lime.

Div. 1. Crystallized.

NATURE, ever instructing us with useful lessons, at first sight often puzzles us. I had long since seen Quartzose mixtures cast, as it were, over tabular Sulphate of Barytes, forming a very accurate mould of them, small or large. Such are commonly called Hacked Quartz, from the notion that they resembled a substance partly chopped or hacked with a hatchet or sharp instrument; and their formation was long left unaccounted for.

It is not uncommon to find Quartz moulds, if I may so call them, of the Cubic Fluor*, on which it often forms coats; and I have a very curious specimen of white semiopaque Quartz having formed over the Metastatic Carbonate of Lime, from Polgooth in Cornwall, with which I was favoured by Phil. Rashleigh, Esq.: but I had not seen Carbonate of Lime forming the mould of Sulphate of Barytes till very lately. I received it from Alstone Moor in June, 1809. The specimen represented in the figure is crystallized in the equiaxe form; and I had another specimen sent at the same time, which was cast over larger Sulphate of Barytes, crystallized in dodecaëdrons with rhomboidal faces—see *tab.* 128—which is very rare: but a still rarer form is when truncated at the edges, as they are in the specimen spoken of—see *the right hand outline.*

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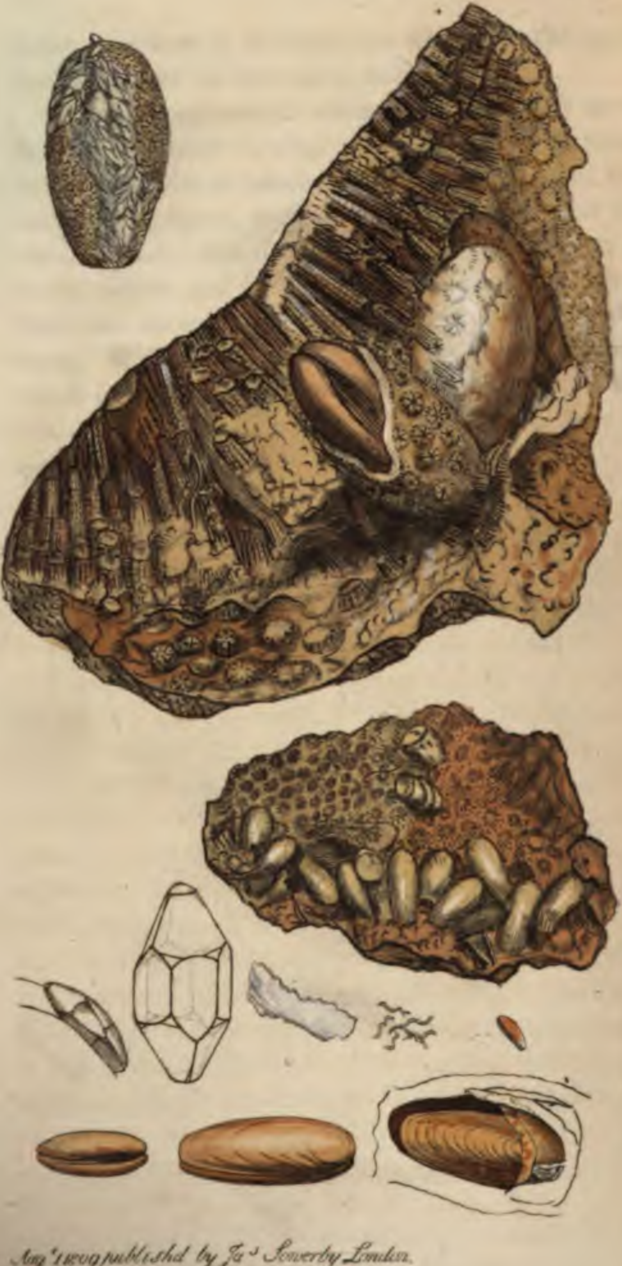
* Sulphuret of Iron often forms a mould from Cubic Fluor, &c.

It is a curious lesson in the study of Chemistry to search for the menstruum in which the Sulphate of Barytes may be dissolved without hurting the Carbonate of Lime; for it is too much undercut, as the workmen would say, to deliver the cast whole; and the facets of the Barytes are very sharp in the mould, and indicate some rare ones that appear to have been extremely smooth with bright and polished surfaces. Whether the Ochre, or other pulverulent matter which is about the specimen, helped it to separate, I dare not say; but I scarcely think that would have been sufficient of itself.



Augt 1 1809 publishd by Jas Sowerby London.

TAB. CCCXXIII.

CALX carbonata.

Coralloid Limestone.

Div. 2. Imitative.

STEEPLE-ASHTON, Calne in Wiltshire, and the neighbourhood, afford vast quantities of Coral Rock, most of which has the common appellation of Coral Paste. It is frequently semi-transparent with a waxy appearance, and the Corals impregnated or cast in it often help the deception. In well-chosen pieces it takes a fine polish, and often exhibits the structure of the Corals and other things which it contains, very beautifully, either like those found in Flint, *tab.* 291, or some other species, of which there seems to be a great number. The present specimens somewhat resemble, and are even more instructive than those from St. Peter's mountain near Mæstricht, which seem to have been contained in a very similar stratum. It appears that the nature of these Coralloid Fossils has not been determined—see *Parkinson's Organic Remains,* Pl. xii. 1. 2. This specimen shows that they ought to be considered as casts with regard to the Coral, which is evinced by the *stellæ* on the case of the *Mytilus,* which, for the sake of distinction, I shall call *M. tunicatus.* On uncovering some of these I found specimens sufficiently perfect to develop the truth, they having been often considered as *Pholades,* and lately as *Alcyonia*; but we must not allow of too much latitude for hypothesis.

The upper corner figure is one of the cased *Mytili* covered with remarkably formed crystals of Carbonate of

Lime—see *the outlines near the bottom of the plate*—often having the facets, as on *the outline below*, mostly convex and rounding, and sometimes bending round or enwrapping the case like *the left hand figure*. This specimen has, in common with others, the *granulæ* that betray the Bath Limestone, *tab.* 8, and the partly Stalactitical Lime, as in *tab.* 1, of a very white colour, and paper-like form—see *the middle figure of the second row from the bottom of the plate*—or with the *fibrillæ**, some tolerably distinct, and others very minute and very beautiful; these often resemble worms, and we occasionally find the remains of true *Serpulæ*, or a kind of worm-shell like those often found on oysters.

The large upper figure evidently shows great variety of casts; the Madrepore often forms six cordate appearances placed star-wise, with or without a column, and other whimsical deceptive appearances. The *Mytilus* has its dwelling among these, its case is variously ornamented with them, either as stars which are the ends of the Corals, or as *striæ*, which are the sides of them. Within one of the coats the hinge end of the Muscle is very distinct. The Muscles are occasionally larger. *The specimen below* shows a number of smaller ones in a smaller Coral. Both these specimens came from Calne. *The lower bottom figure* was taken out of a Steeple-Ashton turbinated Coral, the shell having the *striæ* and appearance of a fresh bivalve. *The next figure* is from one taken out of the small specimen, magnified; and *the left hand one* is a cast of Carbonate of Lime, such as is found within the shells, which determine them to be *Mytili*. This is covered with an Ochre, as are most of the specimens of Corals from Steeple-Ashton.

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* These, Mr. Parkinson thinks, argue against the stellated appearances being the remains of Coral casts; they are partly Stalactitical, produced since the formation of the Coral, and partly the casts of minute worm-holes.

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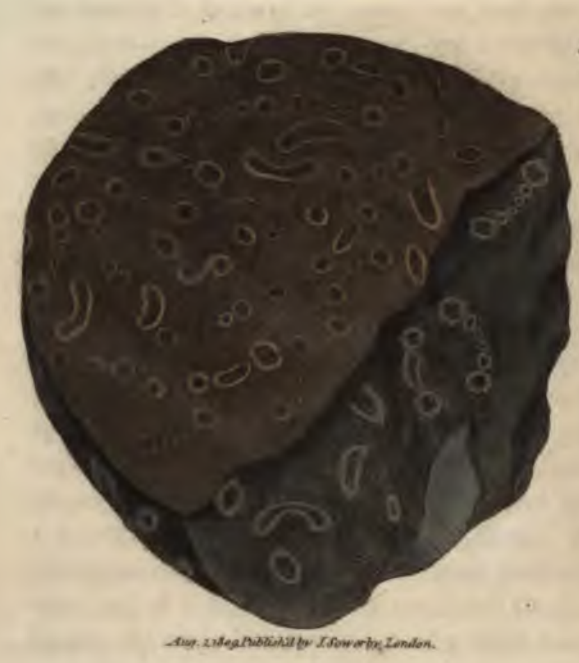

Aug. 1 1809 Publish'd by J. Sowerby, London.

TAB. CCCXXIV.

Chlorite Marle.

When at Sidmouth I found on the shore, nearly under the marley rocks, a Limestone of some tons in weight, replete with shelly remains like this specimen, which is part of an English Boulder. This was in Mr. Day's collection, and he used to admire it for its singularity. It is composed of Marle and Chlorite with the Carbonate of Lime shells; and the chain-shot appearance of the sections of the shells is always presented, let the stone be broken or cut on which side it may; which, in most other stones from Devonshire containing shells of a similar structure, seldom happens; for these generally break parallel with the sides of the shells showing their volution. The Marley Chlorite including the shells is rather the less compact, and takes a bad polish, as in the attempt it becomes rather browner. Upon being fresh broken, it presents a greenish tinge, which is, I presume, owing to the Chlorite.

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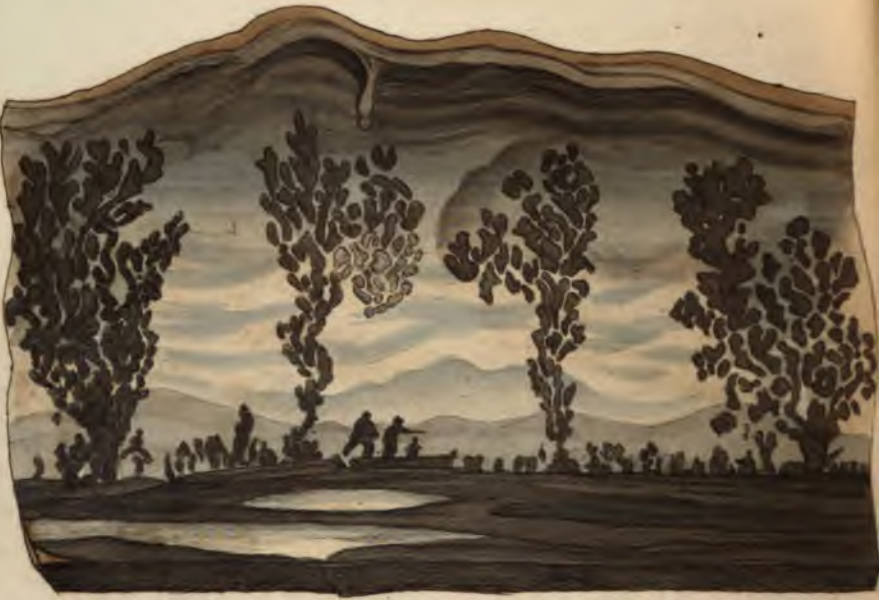

[illegible] published by J. Sowerby London

TAB. CCCXXV.

Cotham Marble.

Syn. Argillo-Calcite. *Kirw.*

Cotham, near Bristol, affords this remarkably figured Marle, which, according to the *Bristol Guide*, you may often imagine is a fine drawing. It is a curious formation of Marle and Clay, chiefly stained by Iron, and perhaps occasionally by Manganese, forming, by settling in moisture under peculiar circumstances, the top undulations, sometimes representing clouds in a sky, while the bottom imitates earth and water as in landscapes. The fanciful figure to themselves in this something like a boat and men in one part, and hedge-rows in another, with trees in full foliage. The appearance of the different parts seems in a great measure to point out the different substances. The whiter part is softer, and has most Lime; the bluer or grayer have a dilute mixture of the black Oxide of Iron; the browner part being still harder in consequence of the state of the Oxide of Iron, and the quantity of Clay or Alúmine; for it must be remembered that Clay often has much Silex mixed with it. The deposition indicates the mass to have been more fluid in some parts than in others; and perhaps some conjecture might be formed as to the trees having distilled in drops from the upper waved surface; but at present we must rest with the theory, the practice of which may lead to useful and certain truths. This substance is found in broad slabs, and is cut transversely from the thickness of an inch to a foot or more. It is sometimes admired for ornamental chimney pieces, and the masons in the neighbourhood have used a geat deal of it for such purposes.

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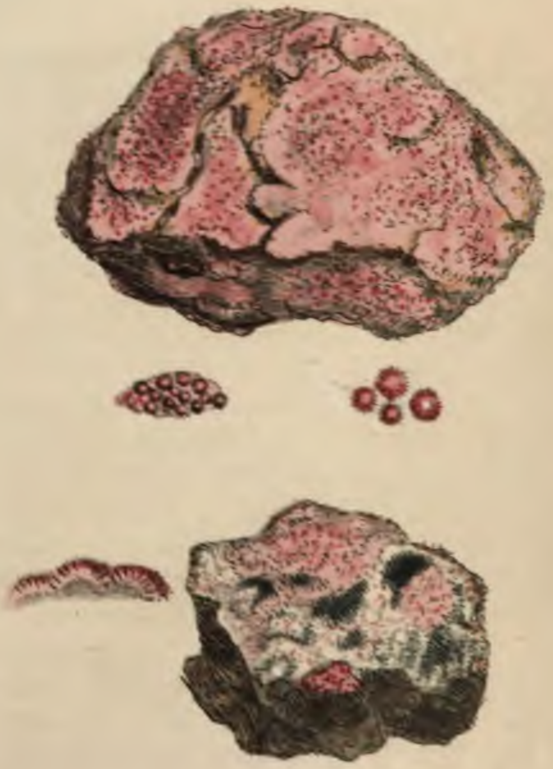

Aug 1 1801 publish'd by Jas Sowerby London

TAB. CCCXXVI.

COBALTUM arseniatum.

Arseniate of Cobalt.

Class 3. Metals. *Order* 2. Oxygenized Compounds.
Gen. 7. Cobalt. *Spec.* 1. Arseniate.

GEN. CHAR. Cobalt united to Oxygen.

SPEC. CHAR. Oxide of Cobalt united to Arsenic Acid.

FLOWERS of Cobalt, commonly so called, are found at Bruton quarry near Edinburgh, and at Alva mine in Stirlingshire. The beautiful soft and tufted *spiculæ* of *the upper specimen* were, when fresh gathered, of a most brilliant satiny appearance, reflecting a fine light or dark rose colour. The little tufts radiate from a centre nearly in a globular form. They are extremely tender to the touch, and lose their brilliancy in a lighter powder. Sometimes the *spiculæ* have a flattish reflecting side or surface, and spread in broader masses, somewhat resembling crimson velvet or plush: they are occasionally nearly white. *The middle left hand figure* represents the little *spiculæ* spreading in tufts. *The right hand ones* are of the same magnified. *The lower figures* have the *spiculæ* somewhat laminated; *the left hand one* being magnified. Cobalt Flowers have lately been imported, and are very valuable. They were first discovered in the quarries near Edinburgh by Dr. Smith, P.L.S., when a student at Edinburgh, in 1781.

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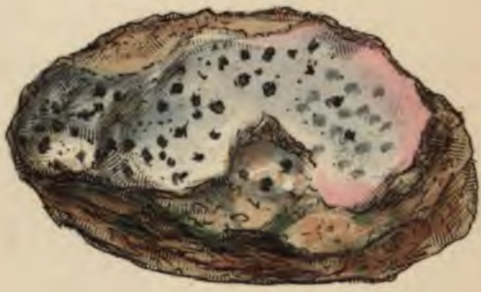

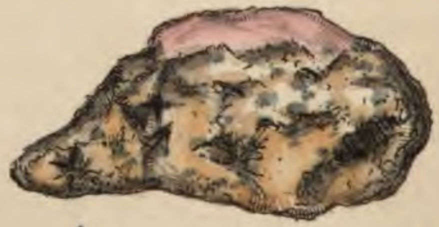

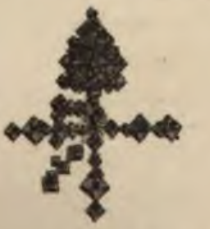

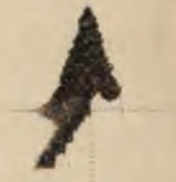

Aug 1 1809 published by Ja^s. Sowerby London.

TAB. CCCXXVII.

ARGENTUM nativum.

Crystallized Native Silver.

Class 3. Metals. *Order* 1.
Gen. 14. Silver. *Spec.* 1. Native.
Div. 1. Crystallized.

Syn. Argent natif octaëdre. *Haüy*, 3. 385.

This specimen of Crystallized Native Silver, accompanied by Flowers of Cobalt, was sent me from Alva mine in Stirlingshire by my kind friend formerly mentioned in this work by the name of G. Laing, Esq. It is a very useful specimen, as exhibiting a very elegant arrangement of the primitive *nuclei*, if I may so call these minute octaëdrons, to see which the help of a magnifying glass is required; and we may indulge a conjecture that the Silver settled from its solvent, whatever that was, at the time the mass was soft, which, when hard, retained it in this state for our instruction.—Thus we see the *nuclei* arranging themselves from loose or distant order, as if preparing to form the close and compact order that is sometimes seen. There being small octaëdrons placed at right angles, and then others arranging in the intermediate spaces, is admirable. We are here informed, as it were, that an accumulation of octaëdrons may be so minute as nearly to fill the interstices, seeming to exclude the necessity of the tetraëdrons, which, I believe, have not been found in Silver.

Thus we have a British specimen of what is reckoned the primitive form of Silver. The matrix of *the upper specimen* is chiefly Quartzose, with some grey Silver having the Native Silver in spots or blotches, and the Cobalt in a white and husky powder. *The lower specimen* consists chiefly of Limestone, with minute crystallized Silver among the grey Silver which is represented larger. The rose-coloured and whiter parts are Flowers of Cobalt, or pulverulent Arseniate of Cobalt.

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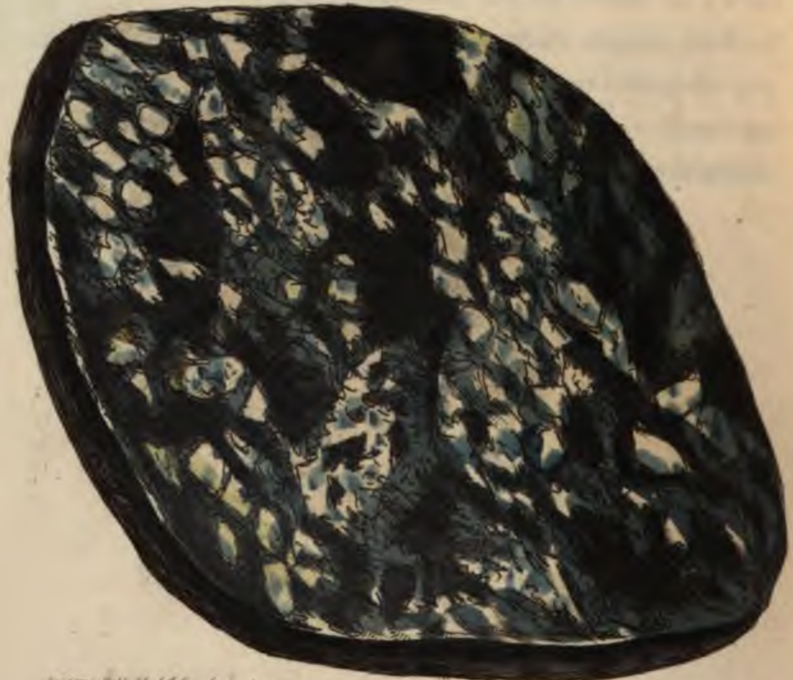

Aug 1 1819 Publd by Jas Sowerby London.

TAB. CCCXXVIII.

Hornblend.

SYN. Common Hornblend. *James.* 1. 357. *Kirw.* 1. 213.
Gemeiner Hornblende. *Emmerl.* 1. 322. 3. 267.

HORNBLEND is common in some of our rocks in various amorphous forms. In this specimen, where it occurs in its close, very compact state, it is of a greenish black colour; but as it seems to spread and become less compact, the green hue grows more and more sensible. It is said by many authors in this latter state to form Greenstone with Quartz and Feldspar, or Grunstein of the Germans; but other substances may form Greenstones: hence the necessity of noticing it. Chlorite may be often confounded with it when the Hornblend is divided; but Chlorite is never so dark, hard, or compact as Hornblend, which can with difficulty be scraped with a knife, and composes the darker parts in this specimen. It takes a good polish as well as the white parts, which are hard Feldspar. The green mixture is rather granular and softer, containing Feldspar. This Stone has several conspicuous particles of Sulphuret of Iron, and of Magnetic Iron. It was part of a Boulder from a gravel-pit near York, and may be called an Hornblend Porphyry with Pyrites and Iron.

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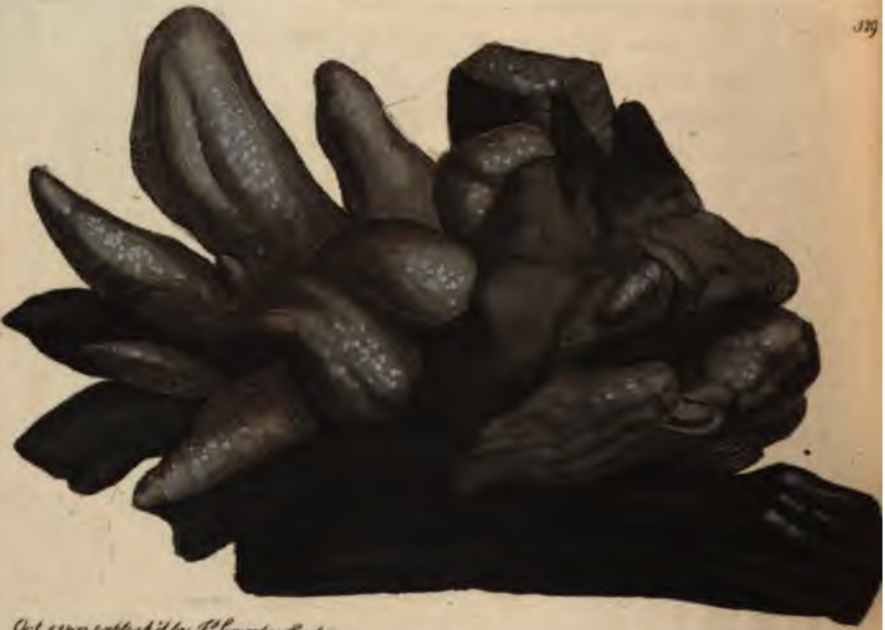

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TAB. CCCXXIX.

CARBO bituminosus.

Staffordshire Coal.

In Coals we see an astonishing contrivance, not only to preserve ancient and vast woods and forests to provide for future contingencies, but, as it were, to the very produce of each successive term of the former vegetable surface; thus acres are piled upon acres and laid up in the grand storehouse of Nature, that nothing may be lost to all-favoured Mankind!

The present Coal is perhaps little else than the remains of wood, and is comparatively but little altered in its construction from situation. The more charcoal-like parts are rather less distinct than in the Newcastle Coal, and the bituminous part mixed more confusedly with it, and it upon the whole contains less foreign ingredients, as every one may experience in the burning it. If slowly burned it will produce ashes which exactly resemble burnt wood, with very little chemical difference. The figure represents the progress from the Coal at the bottom through the cinder to the white ash. The watery parts go off in steam, and the most volatile, the hydrogen and oleaceous parts succeed; then follow the more bituminous, leaving either carbon or ash, according to the degree of heat and time of exposure; or if burned very briskly and in a strong heat, it might become a clinker. Thus I conceive that we have a sort of analysis.

That Coals differ much under certain circumstances there is little doubt; this kind is apparently nearest related to the Cannel Coal by the present analysis, only instead of being somewhat slaty and very compact, it has an external resemblance to Newcastle Coal, which, however, always produces a more perfect cinder irregularly formed, while this in the process divides into rhombic shapes, splitting and curving into branch-like appearances as a cinder, and becoming sometimes blunter and variegated, passing totally into the shaley ash, outwardly resembling wood ash, and like that very light, as it is extremely pulverulent. I should consider this, nearly as Mr. Mushet's Derbyshire Cannel Coal, to contain

Volatile matter	47
Carbon	48
Ashes	4
Loss	1
	100

Great varieties of Coal may be found in the same bed, consequently differing in analysis, some containing Sulphur, more or less Earthy Matter, Iron, &c.

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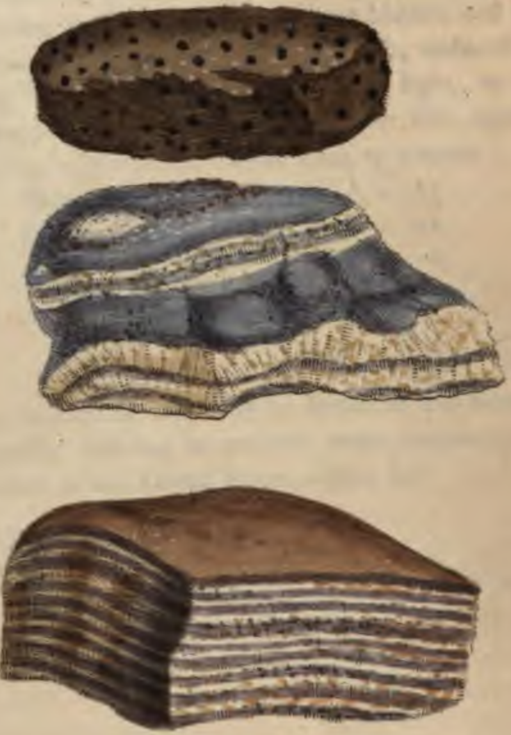

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TAB. CCCXXX.

CALX Fluor, *var.* arenacea.

Arenaceous Fluate of Lime.

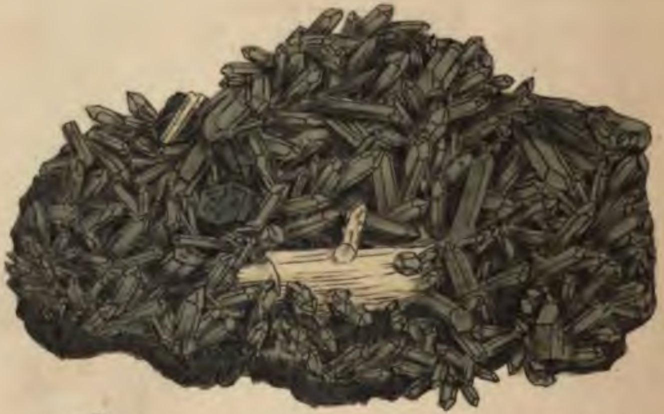
Div. 2. Imitative.

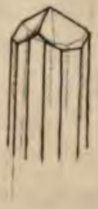
SYN. *Bab.* p. 24.

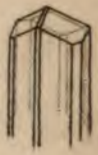
FLUOR is not only found crystallized in company with Quartz, Sulphate of Barytes, Galæna, &c., in aggregate groups, but detached in very small cubic Crystals scattered in the Lime rock—see *the upper figure*, where the Fluor is seen in dark cubes scattered among brown Limestone. Fluor is also found stratified in cubes smaller and smaller until the eye cannot discern them, being in sand-like grains, and finally pulverulent and undistinguishable from their fineness, even passing dendritically among the Carbonate of Lime or Sulphate of Barytes. The noble-spirited Dr. Jackson, who will always sacrifice the best of his collection for public use, was so good as to give me a beautiful large specimen of this kind with Calamine and Galæna, the latter of which is often found in small detached Crystals in the same rock with the Fluor.

The lower figure is granular and pulverulent Fluor, repeatedly stratified with Sulphate of Barytes, which is not very common in an earthy form. Fluor is often of a fine colour when the Crystals are transparent, their transparency often giving great brilliancy to their colour. *The middle specimen* is a good example of a tolerably fine purple in the granular or dusty form, which form is seldom advantageous to colour.

The specimens are chiefly from the neighbourhood of Castleton in Derbyshire: such are indeed found in other parts, but not frequently.







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TAB. CCCXXXI.

ARGILLA electrica.

White Tourmaline.

THIS substance, which seems almost new to the whole mineralogical world, not being spoken of by any author, was sent me in 1804. It was said to be found in a mine in St. Justs in Cornwall. I speak of it as new, being really a *white* Schorl or Tourmaline; for though Tourmaline is said to occur of all colours included in mixtures of yellow, red and blue, yet it is not mentioned as ever having been found colourless or white until now; therefore this is the rarest known. It is transparent in the fragments, but is so divided by cracks and flaws in general as to appear of an opaque whiteness in parts. The form of the Crystals agrees with that of Schorl. Their position, lying exposed among Quartz Crystals, is rather new, as Tourmaline mostly occurs imbedded in Quartz and Petuntse or Feldspar.

The late Hon. Charles Greville, who is much to be lamented from a loss I particularly sustain in the intimate recourse he allowed me to his specimens, pointed out the idea of my specimen being a white Schorl at the time I first showed it to him; even that recollection adds value to the specimen by putting me in mind of a valuable friend. I never could procure a second specimen, or he would have possessed it. I do not know that he ever procured any. I believe Mr. Herbert, who kindly presented me with this, has one also.

Among the small Crystals on this specimen is one that most happily shows the primitive on its end almost detached, as if it were done on purpose, nearly as figured in the outline, which gives it the appearance of lying fitted on the column; indeed the two acute ends are partly truncated by the narrower faces of the octagonal column.

The right hand outline shows the faces of the pyramid and column, which are very distinct.

The left hand figure represents the modifications of some of the other small Crystals, with three oblique faces not before observed by any author,—the thin outline and shining part shows one of them: it was done thus, in order that it might be known most distinctly.

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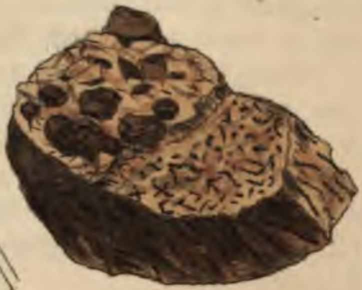

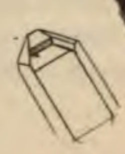

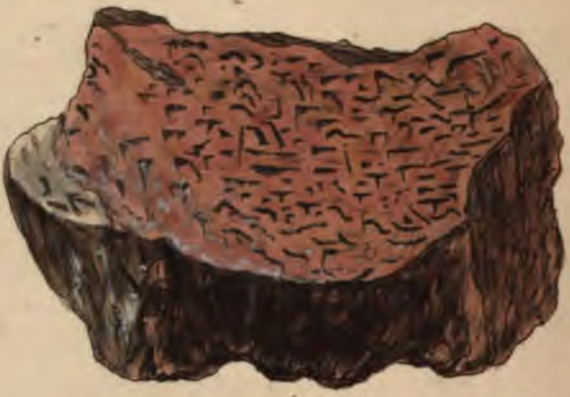

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TAB. CCCXXXII.

Granite.

Class 2. Earths. *Order* 2. Aggregate.
Gen. Petuntse. *Spec.* Granite.

Syn. Roche Feldspathique. *Haüy*, 4. 430.

This Granite is considered as of the primitive formation; it was once brought from Siberia as a great rarity, and cut for seals, &c., at a handsome price, though not perhaps extravagant, being brought so far: it however happens in this instance, as in many others, that where curious minerals are sought for abroad, the same are to be found at home.

Monymusk in Scotland affords many beautiful varieties. One of the characters of Primitive Granites is the crystallization of its component substances; the two of which this is composed are, as it were, coeval in the act of crystallizing, and each in part prevented the other, which gives it the particular appearance in these varieties, said to resemble the letters of the Greek alphabet, though to me they rather represent in form the Hebrew characters:—they have, however, been termed Graphite and Siberian Greek Stones most commonly.

The crystals of the Quartz occasionally terminate in such a manner as to show their facets, and they often present themselves remarkably flat, with a perfectly concordant structure, and even new facets:—thus the shaded face in *the upper left hand outline* is at present new to this substance, more particularly as being placed on the middle of one of the pyramidal faces:—there is some indication of it in some of the Crystals of *tab.* 319.

The position and angles of these Crystals caught in the fracture of the Petuntse give the curious appearance. The Petuntse has rather an amorphous appearance in general, but is all crystallized; and when the large primitive sides are reflected to the eye, they show its beautiful and peculiar lustre. It sometimes shows the terminations. The Quartz varies in colour from transparent to gray brown and nearly black—the Feldspar, from white to reddish and brown. Mica is found in moderate-sized specimens. Two of the ingredients would constitute it a Granitel; three, a Granitine of Kirwan: but these distinctions are not really of consequence; and I am afraid the term Sienite is not much better, unless perhaps as an original term used by Pliny. It is understood chiefly to consist of Feldspar inclining to red, and Hornblende, and sometimes are added Quartz and Mica, as I and others have it from Egypt; myself by fafour of Mr. W. Morel, being detached from one of the pillars at the entrance of the temple of Isis in the ancient Canopus near the fort of Aboukir. Its structure is that of Granite with the addition of Hornblende in a small proportion.

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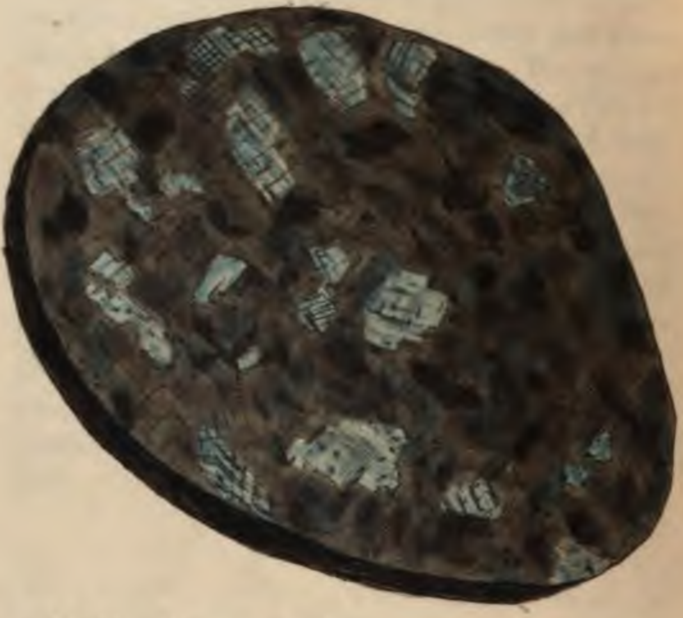

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TAB. CCCXXXIII.

Sienite.

Class 2. Earths.	*Order* 2. Aggregate.
Gen. Petuntse.	*Spec.* Sienite.

This, although very different in appearance from what is to be expected in Sienite, agrees as to the ingredients, especially as being composed chiefly of Feldspar and Hornblende; the latter being more or less in partly formed black Crystals. The Feldspar is grey with a blue iridescence, which is better conceived than figured. The iridescent faces of the Red Feldspar sometimes possess this lustre most beautifully, and I have specimens which I picked up in the road in my neighbourhood, which I suppose to be more rare than the present, which I purchased at the late museum at Yarmouth, as brought from near Aberdeen in Scotland. This is, according to some, a Porphyritic Granite; the Feldspar being relieved by the dark ground gives it a porphyritic appearance.

This is sometimes called Scotch Labradore Stone, on account of the iridescence, which is of the same nature in the grey Feldspar of Labradore, though they are much more brilliant and varied in their colours.

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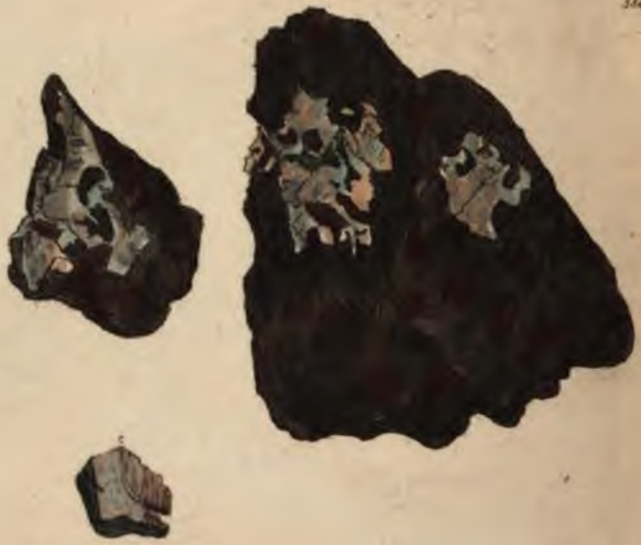

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TAB. CCCXXXIV.

Schiller Stone.

SYN. Schiller Spath. *Emmerl.* 3. 340.
Spath chatoyant des Allemands. *Haüy*, 4. 395.
Schiller Stone. *Jameson*, 1. 428.

ALREADY mentioned at *tab.* 221. This substance is not much known, and although tolerably easily detected when in Serpentine, is not otherwise much unlike some sorts of Hornblende; it is, however, much softer, and is rather easily scratched with a knife, giving a white streak somewhat metallic in lustre, and having a plated appearance. In the British specimens, either from Cornwall or Scotland, the plated structure is more or less readily seen in numerous brilliant specks, from the tenth of an inch to upwards of half an inch in size: the larger plates have frequently a broken or ragged appearance, with holes in them penetrated by the duller Serpentine, or its flat surface forming round about the rugged earth, which often accompanies the dark brick-coloured Serpentine.

The plates seem very thin, and accumulated upon each other; and this is partly seen in some rhombic sides, resembling some slaty structures: on the other sides it is not at all discernible. The substance on the whole is of a dull blueish green, or middle greenish grey—see my *Elucidation of Colours, tab.* 5 *and* 6, *No.* 47*. The plated faces reflect yellowish and reddish illinitions, probably from the position and colour of the matrix. Its peculiar glance is pretty well represented when we see the whitish shining appearance of the print. The substance itself is chiefly recognizable by this glare. On Charcoal with a blowpipe it melts into a black enamel, difficultly when compact, but more easily when in a looser and rather decomposed state, when it is generally of a reddish hue. It has often been taken for Hornblende: it looks very like some Feldspar in its peculiar lustre; and I have seen Carbonate of Lime somewhat resembling it, in the coarser crystallized masses of rocks.

---

* It is usually called Olive green; but olives differ very much. I feel confident that a table for colours and reference will be most exact.

Mr. Hatchett is said to have first observed it in the Serpentine of Cornwall; and I have received specimens from my kind friend Philip Rashleigh, Esq.; and this month I received a specimen gathered by Mr. Jackson in Montrose, Scotland.

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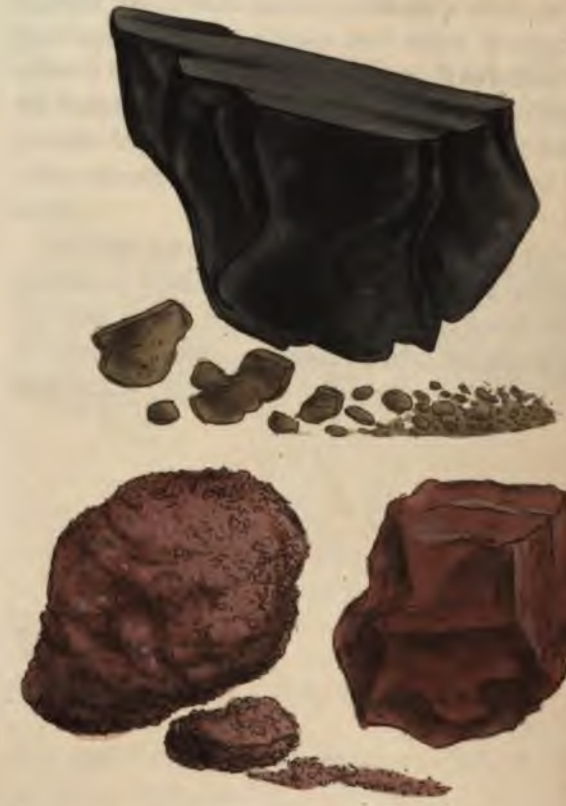

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TAB. CCCXXXV.

The Alluvial Depositions forming Soils.

Class 2. Earths. *Order* 3. Mixed.

The surface of the Earth, alluvial or vegetating Débris, so admirably contrived by the laws of Nature for our agricultural use, have scarcely been attended to by Mineralogists, and in general make so small a part in their works, that they would seem to be of little consequence; and the importance of a more accurate knowledge, and the very use of them in vegetation, has even been superseded by many chimerical ideas. Nature kindly allows, and even invites us, to show industry and sagacity in many instances, but we must be heedful not to mistake her contrivances.

The top figure is a representation of a very fissile rock of a nature scarcely noticed: it is a variety of clayey Shale, containing a small portion of Iron and Bitumen: it crackles in the fire, and when red-hot produces a little flame. The outside passes in colour from blackish to a lightish rusty brown; it splits and falls to pieces in the weather, forming at its foot a soil very different from the original appearance of the rock—see *the representations under it.* I had it from Bakewell in Derbyshire, where it is considered as excellent for Firs, Elms, and Fruit Trees. The Bakewell Rotten Stone, *tab.* 240, is a curiosity in its agricultural character; it is well known to produce white Clover spontaneously the second year after its being formed into meadow. Oaks do not thrive in it: it is a good manure for gravelly soils.

The right hand lower figure represents a part of a red rock from Beaumares in North Wales. It has very much the appearance of a baked tile. The fresh soil formed from this is reckoned very fertile: it forms crumbling lumps—see *the left hand figure*—chiefly composed of Silex, Clay, and Oxide of Iron.

TAB. CCCXXXVI.

Moulds.

The genius of our country, often so happily exerted in agricultural pursuits, has yet much to do in regard to one of the first sources of vegetation; I mean the Mineral Kingdom or Department, which assists vegetation, the link of life, and support of the Animal Kingdom. The example of old ground not requiring manuring is not common. I am glad here to show one in *the upper figure*, which represents Mould from Wilson field near High Wycomb, Bucks, which produces regularly fine crops of wheat without manure, and had so done for eighteen years in June 1801, when Mr. Allen gave me the specimen. It may be remarked, that among some hundred kinds which I have examined, I have not seen one exactly resembling it, and therefore I presume to hope that external characters may be of more importance in this subject than has hitherto been suspected. It is evidently mixed with Chalk in little pieces. The Silex seems to be in very small grains held together by common Clay and vegetable Mould.

The right hand figures are from Orcheston St. Mary, about two miles from Salisbury, famous for producing extraordinary crops of Long grass. Excluding the small bed of loose pebbles, which is a common washed gravel found beneath, I have figured the Mould as it is immediately connected with the roots of the plants, an inch or two in depth. It seems to be fine sand, held together by Clay mixed with fine dirty Chalk and vegetable remains, some parts full of roots, and others more detached and easily separated. Its situation allows of much water occasionally,

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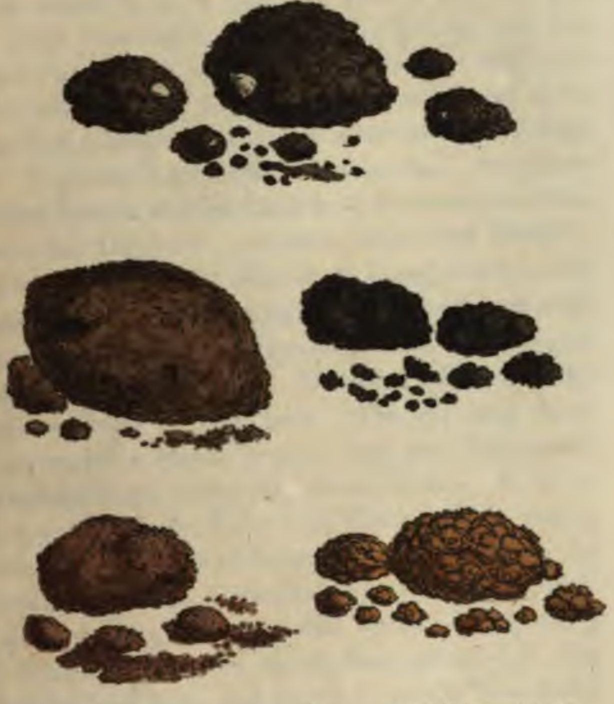

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hich of course fertilizes it; but it has still a different ap- earance from any other Earth I have met with. The de- tched pieces adhere rather strongly, and are rather hard break; a character which I have known brick-makers to ll water-bound. I believe it to be a vegeto-carbonaceous nding, if I may term it so.

The next left hand figure is a soil from Shrewsbury with hich I was favoured by Colonel Green. Its peculiar ap- earance caused it to be noticed. It is a very fine, but oser Earth than either of the former; perhaps has less mmon Clay, and it appears to show more Chalk with liceous pebbles; and it connects its particles so as to ave hollow interstices, although often in largish fragments. It produces good wheat, barley, &c. *The lower ght hand figure* is of a fine Earth for Oaks from Lord Fitz- illiam's fine Oak-park about nine miles from Sheffield, orkshire. It is a light ochraceous Loam, chiefly Clay d fine Sand coloured by a lightish Oxide of Iron with me vegetable Earth. It is remarkable for an astringent tter taste, resembling Bark. The largest Oaks in Great itain are found in this park. *The left hand lower gure* represents a Mould brought from near Bridgenorth Shropshire by my friend Mr. Charles Stokes. It is re- ted as very fertile for Barley and Wheat, and for retaining moisture when most of the neighbouring lands are dry d sterile. There is a remarkable gravel terrace near it. e red appearance with a peculiar softness in the aspect akes it noticeable. It is mostly Sand mixed with Clay d Red Oxide of Iron, and does not seem to have much me or Vegetable Matter among it.

The analyses of Vegetable Earths, &c., are well treated in many books, particularly Kirwan's Essay on Ma- res, and H. Davy, Esq., for the Board of Agriculture. is, however, desirable to gain as much knowledge as can of a soil by figures and practice also; otherwise we cannot compare one soil with another, or the part of a soil analysed with the land from which it is taken.

Lapidaries guess pretty well of hard Stones by sight with practice, so should those concerned in agriculture. Indeed it would be very convenient if we could compare a written analysis, for instance, soil taken from Sheffield Place, remarkable for producing flourishing Oaks, analysed by Davy, and found to consist of

Water	3
Silex	54
Alumine	28
Carbonate of Lime . .	3
Oxide of Iron . . .	5
Decomposing matter .	4
Loss	3
	100

and the Oak soil figured from Yorkshire: we might conceive the five parts of Oxide of Iron to give the colour; the Silex grittiness; the Clay unctuosity; the Lime taking a part from its unctuosity as well as the Sand; the Vegetable a soft matter distinguished from both by a rotten and carbonaceous appearance. According to experience, his Oak land would to me differ in being a little lighter-coloured, having a little more chalky whiteness, or having a little more Lime than ours contains, and perhaps being of a finer grain. This may be learned best by experience; analysis may prove it.

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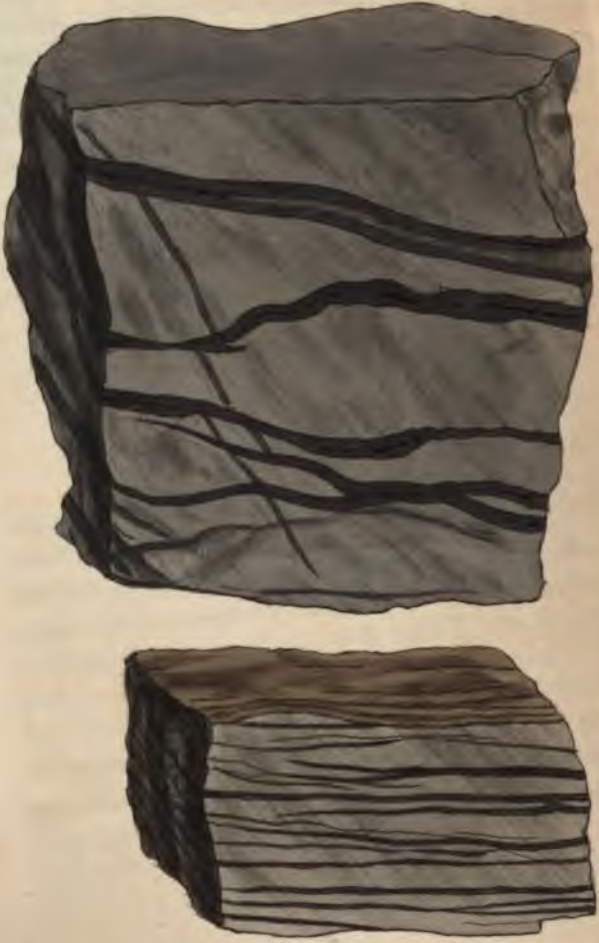

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TAB. CCCXXXVII.

STANNUM oxygenizatum.

Oxide of Tin (in veins in Schist or Killas).

Class 3. Metals. *Order* 1.
Gen. 5. Tin. *Spec.* 1. Oxide.
Div. 3. Amorphous.

Syn. Tin veins in the Killas, or argillaceous Schist.
Kirw. 1. 237.

It is very instructive to see the form of the Tin veins and their direction with regard to the formation of the Schist or Slate, they being either straight, or curved in a remarkable manner, and usually crossing the laminæ of the Slate.

The upper specimen came from St. Agnes in Cornwall, and consists of the coarser Killas*: the oblique position of the veins in the larger specimen shows it to be from a lower part of the primitive Slate formation than *the under figure*, in which they are finer and more parallel, being of a rather later formation.

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[*] *Killas* is the Cornish term for the primitive Schist in which Tin is found.

TAB. CCCXXVIII.

STANNUM *oxygenizatum.*

The *upper figure* came probably out of a large vein of Tin, and is what the Cornish miners call Shoad Tin. It occurs in the neighbourhood of the primitive formation among alluvial deposits from it. It is much the same as that in the veins, composed of more or less confused masses of Crystals. These, and even the perfect Crystals, are often found worn into pebbles in the streams, and are termed Stream Tin, resembling common Flint Pebbles, or Gravel Stones. They are of different colours, as here figured, and may best be known in the first instance by their superior and extraordinary weight in the hand. They are also called Grain Tin when in grains or very small portions.

The streams are often conducted with much attention over chasms and small valleys to the lower grounds, where means are contrived, by washing, to collect large quantities, separate from the mud and other matters, and equal to that obtained by mining. There is moreover less trouble in the separating and breaking for smelting.

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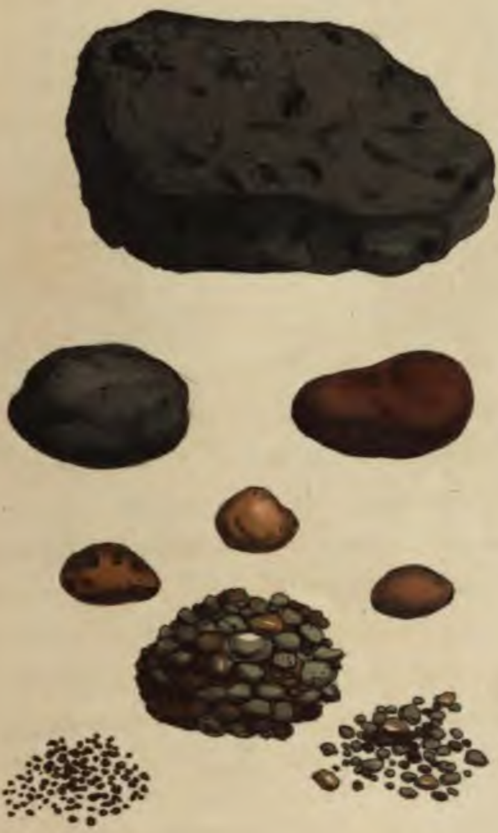

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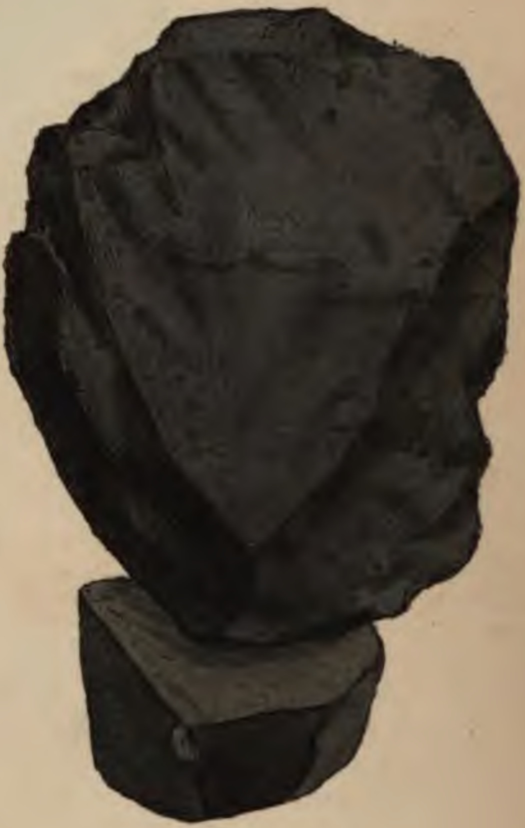

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TAB. CCCXXXIX.

STANNUM sulphureum.

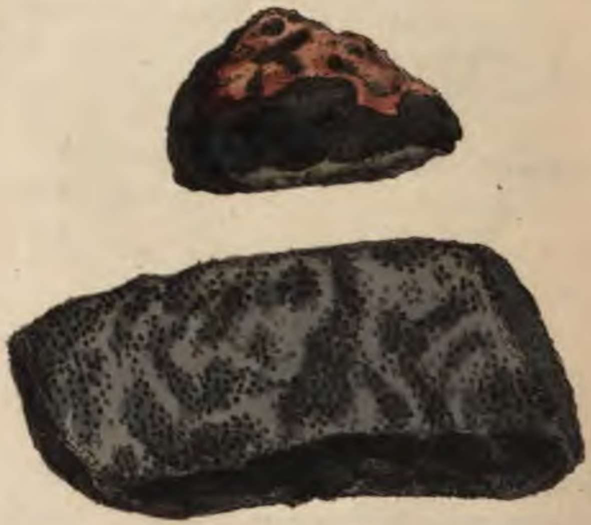
Sulphuret of Tin.

Class 3. Metals. *Order* 1.
Gen. 5. Tin. *Spec.* 2. Sulphuret.
Div. 1. Amorphous.

SYN. Tin Pyrites. *Kirw.* 2. 200.
Sulphuret of Tin. *Babington, Cat.* 214.
Zinnkiess. *Emmerl.* 2. 418.
Etain sulphuré. *Haüy*, 4. 154.

THIS was, and still is, a rare substance, and is only yet known as found in Cornwall; first at St. Agnes in the time of the celebrated Klaproth, in a vein about sixty feet below the surface, and nine feet wide; and since some has been found at Huel Scoria.

The upper specimen was brought from the former place, and, according to Klaproth, was found in what is called Growan by the Cornish miners, which is decomposed Feldspar of the Granite rocks:—see *tab.* 224. Rasp, who resided in Cornwall at the time, gave it, because it contained much Copper, the name of Bell Metal Ore. To Bell Metal it bears some resemblance, and is brittle like that. In so large a vein it must be supposed to vary a little, being occasionally grayer or yellower, with more or less Copper. Klaproth observes that Rasp's name would be more just if there were a larger proportion of Copper to the Tin. The



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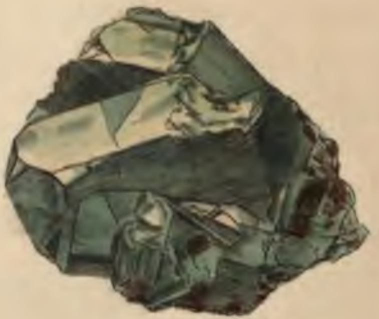

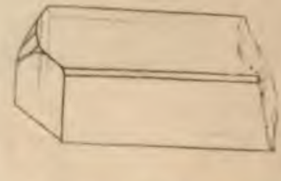

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TAB. CCCXLI.

PLUMBUM sulphatum.

Sulphate of Lead.

Div. 1. Crystallized.

These peculiar green Lead Ores have created some confusion among Mineralogists, from their having been considered by several as Molybdates of Lead*, which, I believe, we have not yet found in this country. I was favoured with the present specimen from Wanlock-head by G. Laing, Esq., who has so often kindly given me occasion to mention him in the course of this work.

The Crystal is a long rectangular prism placed upon one of its sides. Two of its faces, the upper and lower, are primitives; the larger two terminal faces are also primitives, being the sides of a rhomboidal prism; the middle of the three smaller faces is on the acute solid angle, the other two are on the succeeding, or the thus newly made solid angles. We find this to be the same primitive as *tab.* 153, which upon further examination proves to be also a Sulphate. Its insolubility in hot Nitric Acid diluted, confirms its being a Sulphate, besides other trials, by some of which we are led to suspect a small portion of Muriatic Acid; but we had too small a morsel to try it perfectly†.

The green hue of the present specimen may depend upon Oxide of Iron, or some foreign ingredient.

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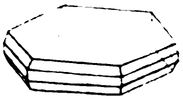
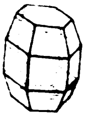
* Found in Carinthia.

† It would be very desirable that Mr. Gregor, Dr. Wollaston, or some such person, in whom we may place confidence, would examine these substances.

342.





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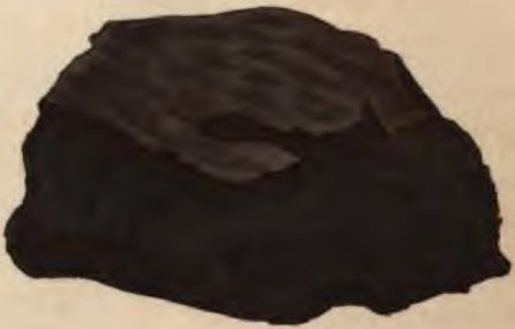
TAB. CCCXLII.

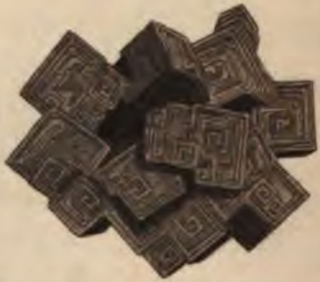
PLUMBUM carbonatum.
Carbonate of Lead.

Div. 1. Crystallized; *in hexaëdral laminæ.*

Carbonate of Lead of this form and colour has for many years been considered as a Molybdate. Its readily effervescing in dilute Nitric Acid will, however, betray it. The modifications of the present specimen are remarkably striking, and are evidently to be traced from, or to, the plated forms of *tabs.* 89, 90, and 91. The Crystals have a light glare, and somewhat pearly lustre, and are in colour from nearly white to greenish yellow; scattered in irregular fissile hexangular plates, or more compact:—see *the middle figure,* which contains plates nearly like *the lower left hand outline,* or piled up as that on *the right hand.*

These specimens are very rare, and occur only now and then in the Wanlock-head mines near Glasgow. I have one from Mr. Day's collection, some years old; and some by means of other friends. I do not know that they are found elsewhere, or are at all described as green, or approaching thereto. They are said to be snow-white, grayish and yellowish-white, cream-yellow, and clove-brown.





Dec 1 1809 published by J.s Sowerby London.

TAB. CCCXLIII.

VISMUTUM nativum,

Native Bismuth.

Class 3. Metals. *Order* 1.
Gen. 13. Bismuth. *Spec.* 1. Native,
Div. 1. Crystallized.

SYN. Vismuthum nativum. *Waller*, 2. 205.
Gediegen wismuth. *Emmerl.* 2. 434.
Native Bismuth. *Kirw.* 2. 264.
Bismuth natif. *Haüy*, 4. 184.
Vismutum. *Linn. ed.* 13. *p.* 128.

THIS is a rare substance as British, It came from Cornwall, and was among the specimens I had the good fortune to procure of the late truly ingenious Mr. Day. It appears in the centre of Amorphous Brown Quartz. It has some admixture of gray or dark Sulphuret and other substances, perhaps Cobalt, with Oxide of Iron, &c. At Johann-Georgenstadt and Sneeburg in Germany, it is sometimes found crystallized in four-sided tables, in somewhat cubical or truncated tetraëdrons. Its primitive form is an octaëdron. The colour of the present varies from whitish to tarnished yellow, reddish or purple; metallic fracture more or less perfectly foliated, *folia* parallel to the planes of a regular octaëdron. The peculiarly beautiful crystallization of this substance obtained by melting it in a proper degree of heat, and then suffering it to cool, attracts at-is generally thought.

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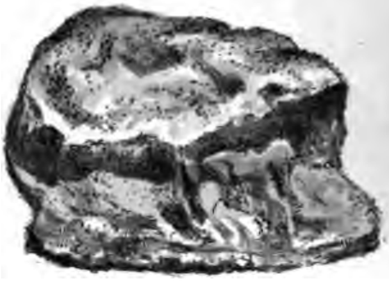

Dec 1 1809 published by J. Sowerby Lond

TAB. CCCXLIV.

VISMUTUM carbonatum.

Class 3. Metals. *Order* 2. Oxygenized compounds.
Gen. 13. Bismuth. *Spec.* 1. Carbonate.
Div. 1. Amorphous.

This common earthy-looking substance, being chiefly Carbonate of Bismuth, with a little Oxide of Iron, and a very little stony substance, came to me by favour of the Rev. W. Gregor, from St. Agnes, Cornwall. That gentleman, often usefully employed for his amusement in analysing minerals, is an honour to his country. We think it of much consequence to figure such a substance as the present; for, by remembering the figure or the substance, we shall not too hastily pass over things which at first have common appearances; but examine them with attention, which will habituate the judgement to the easy discrimination of obscure characters, and teach us to suspect what is not quite usual, and therefore to examine it, if necessary, by means of chemical agents.

Nature, in this mineral, seems to point out something of the soapy appearance of Steatite:—see *tab.* 222; but it is more earthy, or rather harsher to the touch, though the Oxide of Iron in some parts disguises it. The weight in the hand seems greater than that of Steatite. As Oxide of Bismuth has been found a most beautiful and pleasant pigment for high-finishing water-coloured drawings, and as the present specimen does not apparently change colour, as that does, on exposure to light, I was led to think it might afford a lasting pigment, and instead of spoiling many a highly finished drawing, and operating to disgrace the artist, Bismuth might be brought to recover its own fame in the form of a Carbonate, and be a lasting memorial of the spirit of the artist's touch; but upon trial I have not found the artificial Carbonate at all equal in lustre to the Oxide.

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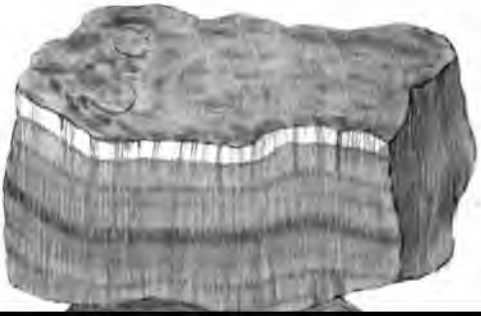

TAB. CCCXLV.

CALX carbonata; *var.* fibrosa.

Fibrous Carbonate of Lime.

Div. 2 Imitative.

THIS substance has been long known; but, I believe, has not been noticed in any publication, if we except Dr. Kidd's Outlines of Mineralogy. I have a piece in my possession which is reported to have belonged to Da Costa, who was said to be at a loss what to call it. I have also received it from different friends at various periods; which shows it to be sufficiently remarkable to attract notice, and that it would appear a desideratum if passed over in this Work. It was probably first noticed at Bath, or in the quarries in that neighbourhood; but is also found in most Limestone quarries, varying much, accordingly as the stratum in which t is found is more or less compact. I gathered *the upper pecimen* at Shotover Hill, where it is not uncommon; ut these were rather remarkable, as the fibres were mostly o very loose as to resemble in texture some rotten wood, which has lost the transverse fibres, and become petrified. t separates into extremely fine filaments, which, after separating, break so nearly, if not quite, transversely, as not o show in the least the rhomboidal fracture (a character eculiar to it and the Satin Spar). *The middle figure* shows he varieties of its colour, from nearly white to the sual brown; and was sent from near Bath. *The ower figure* is taken from a specimen found at Mitord, with which I was favoured by Thomas Meade, Esq.*

---

* I beg to correct a mistake in this gentleman's name;—it should always e read as above, not Charles, and should have the terminal e.

It is remarkable for the bending of its filaments, and not less so for the holes apparently formed by the *Mytilus tunicatus*, (which I find abounds in variety of petrified Corals, &c., found between Oxford and Bristol,—see *tab.* 222.) There are also cases of *Serpulæ* about it. This proves that the structure of the substance preceded that of the *Mytilus*, and that it may have been coeval with the Corals, or even of earlier formation. It is sometimes dull and opaque, sometimes almost transparent, and nearly as shining as Satin Spar*.

---

* I must here remind my readers, that the habitat I have given for Satin-Spar, *tab.* 5, *p.* 11, is correct; for some other authors have, by mistake, and by copying from each other, named Derbyshire for its habitat, and this seems to have originated with Jameson, who probably purchased some specimens there, and where, not long since, has been found striated Gypsum or Sulphate of Lime, so compact as much to resemble the Satin-Spar, and like it has been cut for ear-rings, necklaces, &c. The former may be readily distinguished from the latter by being easily scratched by the finger-nail.

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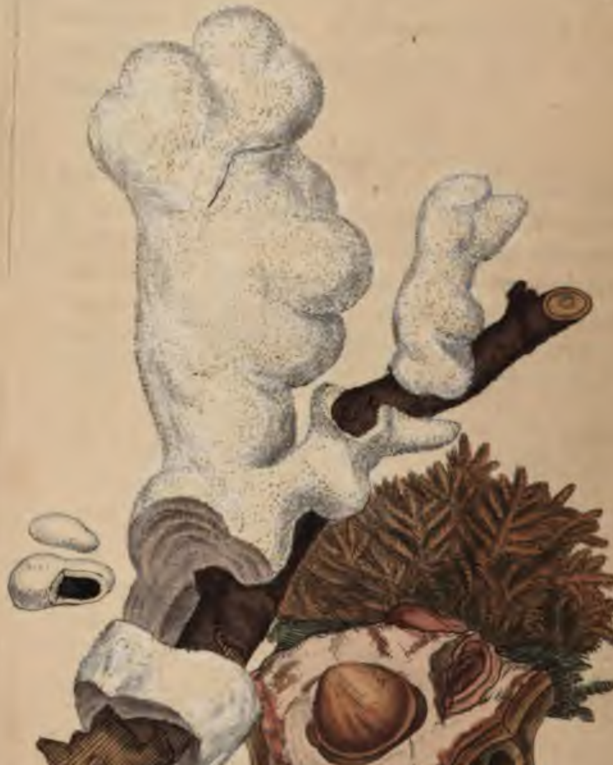

Feb 1 1801 published by J Sowerby London

TAB. CCCXLVI.

CALX carbonata.

Incrusting Carbonate of Lime. Osteocolla.

Div. 2. Imitative.

SYN. Osteocolla. *Enc. Brit.*
Chaux carbonatée incrustante. *Haüy*, 2. 172.

OSTEOCOLLA being mentioned in most modern books, it may naturally be inquired for in mine: and as I should hope not to be wanting where there may be information given, I herewith exhibit a figure of this substance, which is more than ordinarily instructive, although only a variety of Stalagmite. The present specimen was found near Shotover Hill, and shows the curious mode of its accumulation, especially as the substance of the branches is yet distinct. It is called Osteocolla from being supposed to have a power of uniting broken bones. It may vary with the nature of the current that deposits it. This specimen has a peculiarly soft and chalky, somewhat woolly, appearance. It is nearly of the same nature as the deposit in a tea-kettle; but that is harder, and may give an idea that it depended on the water being heated. We find these depositions to be generally about this hardness, or perhaps a little harder and rather more compact. Westminster Bridge has a settling of the Lime from the water on some parts of its sides of a curious undulating figure; and moss with many other subjects, such as birds-nests with the eggs, are covered in a similar manner at Matlock and Knaresborough, first settling outside, and then accumulating as the substance sometimes rots. This is especially the case in Moss, when it seems to have taken the entire figure of it. I add a specimen of the Moss; but there are many varieties, some even showing the species by the cast over it. Sometimes the splashing of the water falling from a height heaps the small grains on each other, and forms natural grottos. *The specimen figured below*, having been deposited in the place of a nut kernel, is truly beautiful. I was favoured with it from Knaresborough by the Rev. W. Danby, accompanied by reflections upon it, such as the contrivances of Nature generally excite in a truly enlightened mind. Lady Wilson has lately brought me some granula of Carbonate of Lime deposited in water used at Charlton House, which are very small, resembling common sand, and which help to show that Ketton Stone is merely a deposition of the same kind. Is it the disturbing of the water, or any particular motion, that might cause the Lime to form granules? We have great variety from this to the Botryoidal stones found in Rutlandshire of a large size:—see *tab.* 284.

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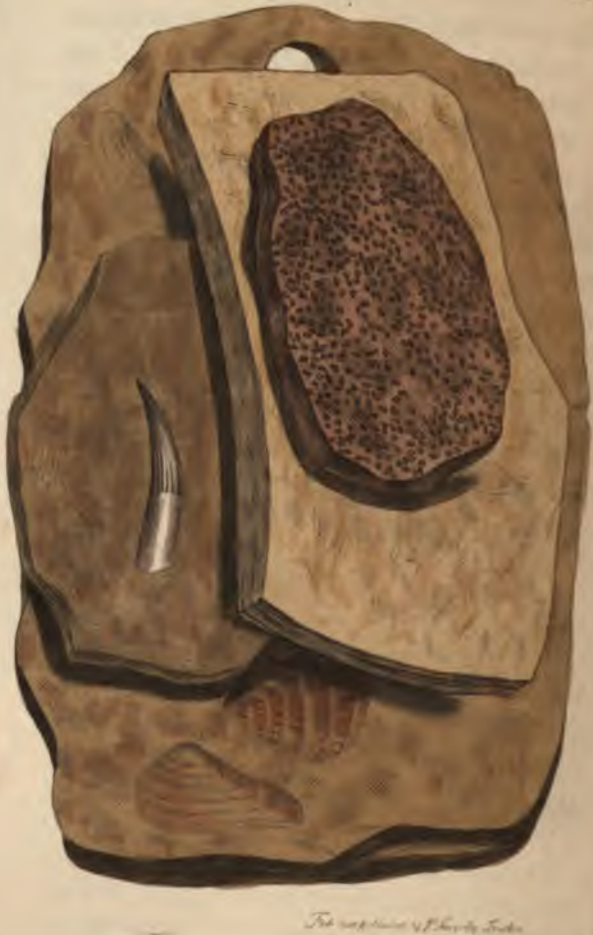

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TAB. CCCXLVII.

CALX carbonata.

Calcareous Schist.

Div. 3. Amorphous.

The term Slate is applied to very different Stones; but it is more generally understood as belonging to the blue or gray Slate, commonly so called when it is even a term for colour, as Slate-colour; but this term does not lead to accuracy, as Slate is found to vary in this respect. Colour formerly helped to distinguish the species for common use; but now many varieties, both in colour and texture, are used! While Slates are common in some counties, in others the people are strangers to them; and luckily find Limestone so fissile as to serve for roofing their houses; and this, being schistose or slaty, has obtained the appellation of Slate.

The lower figure came from Stonesfield, Oxfordshire, and has often in its fissile divisions shells, sharks' teeth, and other things of this nature. These Stones often have fishes' teeth in them, perhaps most remarkable at Verona in Italy. When Stones for building are chosen from these quarries, it becomes necessary to place them nearly as they were in their native places, else by exposure they split perpendicularly, and fall from their places in flakes; which may occasionally be seen in Limestone buildings.

The small upper specimen was found about 2 or 3 feet from the surface in Sussex, and furnishes strong argument for its very recent formation. Little petrified shells, resembling the minute stagnant pool muscle or bivalve, if not one of the same species as now exists, cover it in every division very abundantly; and like other fissile Stones, the bivalves show the convex on one side and the concave on the other. I am obliged to my friends Messrs Borrer and Weeks for the specimens in my cabinet. The next specimen is from Stonesfield, a quarry famous for a great variety of animal exuviæ, especially of the genus *Cornu ammonis*. This has an alligator's tooth finely preserved. If we may be allowed to judge from the teeth, there have been many species of alligators enveloped in the catastrophe that made such wonderful havock. The other two pieces, *the upper* of which is without any appearance of petrifaction, are a sort which is often divided by very silvery-looking Mica covering the fissile surfaces, and mostly accompanying the more sandy sort:—we find by Lady Wilson that it approaches even to a Jasper. *The lower specimen* has casts of different bivalves, and has a hole in the top, which shows in a small degree the manner of manufacturing them for Slates. Several of the above specimens contain a considerable portion of Sand. All Limestone quarries have a more fissile Stone near the top: those of Portland, Purbeck, and Bath are generally shelly, and sometimes merely a congeries of compressed shells almost as thin as paper.

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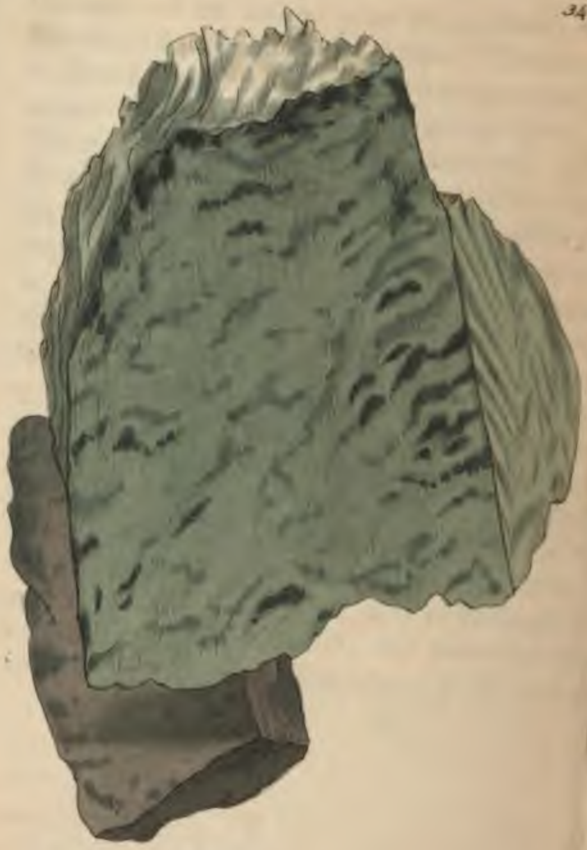

Feb.y 1810 published by J. Sowerby London.

TAB. CCCXLVIII.

SILEX talcum.

Massive Talc, Potstone, or Lapis-ollaris.

Div. 1. Crystallized.

Syn. Potstone. *Kirw.* 1. 155.
Lapis-ollaris. *Waller. Bab. Min.* 39.
Talc ollaire. *Haüy*, 3. 257.
Topfstein. *Emmerl.* 3. 282.

Although this is not a rare substance in countries where Serpentine Rocks occur, it is nevertheless often too unequal in its nature to answer the purpose of turning into pots. In Scotland it is abundant; and the Duke of Argyle's house at Inverary is said to be built of it; yet it is but little known. I have seen sets of tea equipage, and I have a tankard made of it from abroad; and in Saxony it seems that hundreds of people are employed in manufacturing it. The usual kind abounds with Talc, and is of an even and close texture; but that which is used varies much, and more or less approaches Talcose Schist and Serpentine. Some of the cups which I have from Italy seem to be a Talcose Schist, with Garnets of such an equal state of hardness, that the whole turned equally well.

The upper figure is a representation of a specimen from Breadalbane of the common texture; but the fibres are rather more than usually varied in their direction, so as to make it nearly free to cut or turn to any form.

The lower figure is a more Schistose variety, from the same place, commonly called Schistose Potstone. The different kind of Potstones vary much in colour.

I have figured this substance rather as a mineral than as a specimen of such as is turned in the lathe, although it would answer the purpose pretty well in a certain proportion. Its stellated formation is rather rare; I have not, however, represented that variety: but, from what has been said, it may be readily understood that there may be numerous varieties; and those of the most equal texture throughout are to be preferred. They are generally somewhat porous, and sometimes do not hold water better than the vases, &c., made in Derbyshire and other Fluor countries.

The inhabitants of New Caledonia occasionally use a sort of Potstone Steatite to assist them in the place of food when it is scarce.

I wonder that there are no such Potstone manufactories in Great Britain as those in Saxony; for I think there is but little doubt of procuring the Stone as likely to answer this purpose as the foreign sort. Perhaps, however, there would not be a sale for them.

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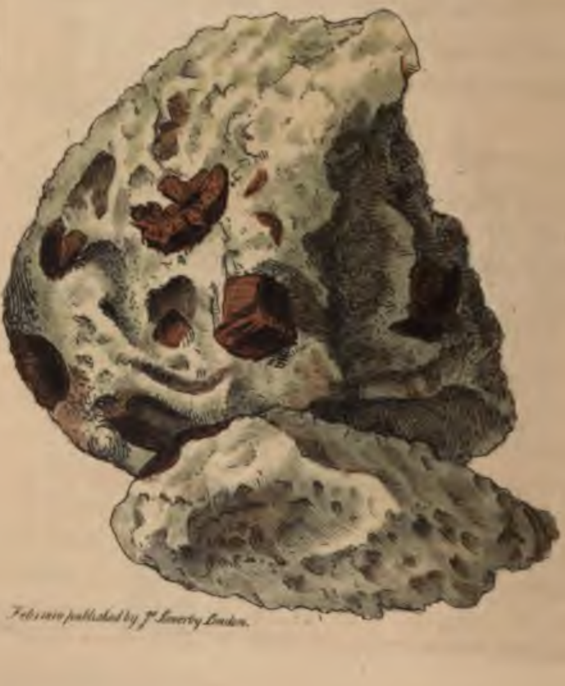

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TAB. CCCXLIX.

ZINCUM sulphatum.
Sulphate of Zinc.

Class 3. Metals.	*Order* 2. Oxygenized Compounds.
Gen. 4. Zinc.	*Spec.* 2. Sulphate.

Div. 1. Crystallized.

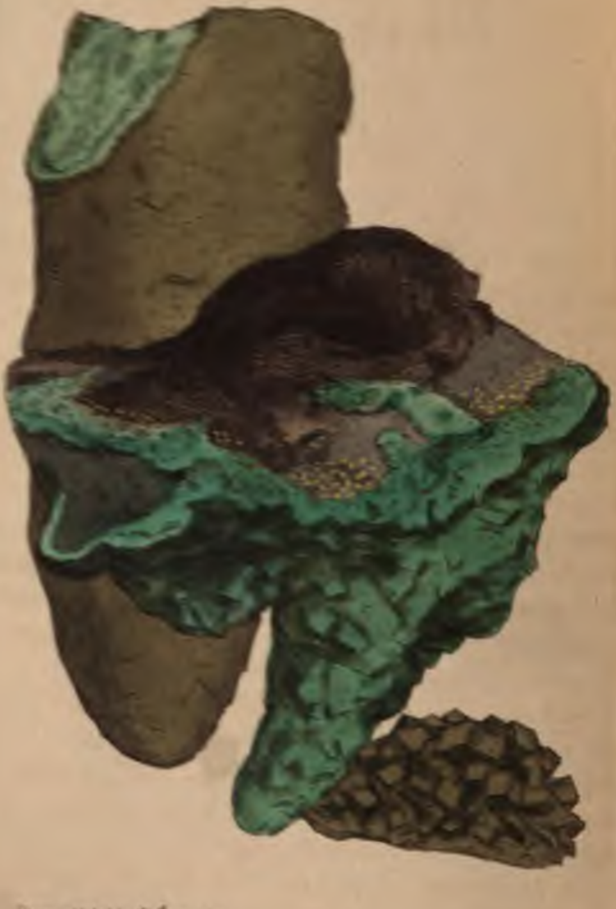
Spec. Char. Oxide of Zinc combined with Sulphuric Acid.

Syn. Vitriol of Zinc. *Kirw.* 2. 23.
Zinc sulphaté. *Haüy*, 4. 180.

Sulphate of Zinc is found at Holywell in Flintshire; and the specimens which I have were brought from thence. It is formed on a red earthy Oxide of Iron, and is chiefly distinguished from the Sulphate of Iron, or Copper, by its whiteness, being commonly called White Vitriol and even White Copperas. I have not seen it crystallized in its native state. It is slightly laminous in its fracture, and is formed rather irregularly in holes or foramina. It is soluble in twice its weight of cold water, and has a strong styptic taste. When pure it consists of

Oxide of Zinc . . .	40·
Water	39·5
Sulphuric Acid . . .	20·5
	100·0

350.



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TAB. CCCL.

FERRUM sulphatum.
Sulphate of Iron.

Div. 2. Imitative.

The *upper specimen* is a remarkably fine Stalactite from Cornwall, and has been in my possession many years without having apparently undergone any alteration, which is seldom the case. I have shown specimens in Plates 23 and 28 which have a very different appearance. It is commonly called Green Martial Vitriol, is usually soluble in twice its weight of cold water, and less than its weight of boiling water. It is said to have a double refracting power in proper and transparent Crystals. It is used for making ink with oak-galls, and gives it a peculiar astringent taste. It produces black with any vegetable, and is a styptic. The specimen figured above has some signs of the primitive rhomboidal angles about it.

The lower figure is taken from a North Wales specimen: it is more apt to decompose, and shows the changes it undergoes under these circumstances, as it becomes yellow or brown, sometimes crumbling into a Sulphur yellow. The primitive Crystal is somewhat apparent about this specimen; but *the lowest figure* is most perfect in that respect; such is sometimes found in Cornwall and Derbyshire. Dr. Kidd mentions finding it in the Shale that overhangs Odin mine at Castleton in the latter county. Sulphate of Iron is often of a fair green colour, (see *Elucidation of Colours*) lighter or darker, by which it is known from Zinc, which is nearly white, unless coloured a little with Iron or Copper. Sulphate of Copper is always much bluer, and approaches the Sulphate of Iron, if adulterated by Iron, which often happens. *Spec. Grav.* of Sulphate of Iron 1·88.

Analysis according to Kirwan:

Oxide of Iron	28
Water	46
Sulphuric Acid	26
	100

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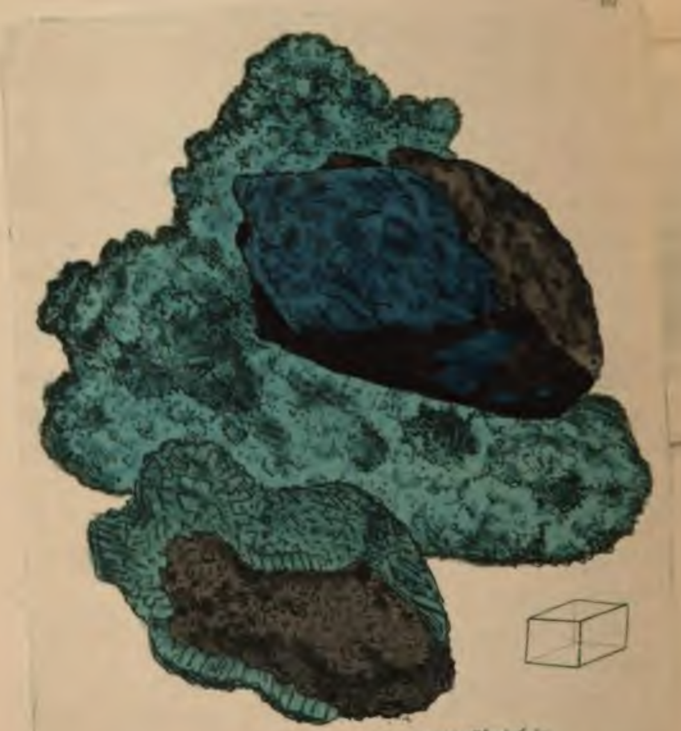

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TAB. CCCLI.

CUPRUM sulphatum.

Sulphate of Copper, or Blue Vitriol.

Class 3. Metals. *Order* 2. Oxygenized Compounds.
Gen. 12. Oxide of Copper. *Spec.* 3. Sulphate.
Div. 1. Crystallized.

SPEC. CHAR. Oxide of Copper combined with Sulphuric Acid.

SYN. Vitriol of Copper. *Kirw.* 2. 22.
Cuivre sulphaté. *Haüy*, 3. 580.

According to my specimens, which I have had many years, this is found in those rocks which are usual in North Wales, in which Cubic Pyrites so much abound, and is occasionally adulterated by the Iron. It is most pure when nearly deep blue with a greenish cast; but is sometimes lighter coloured, as figured. It is less soluble than Sulphate of Iron, requiring four times its weight of cold water, and twice its weight of boiling water for solution; it is also styptic to the taste. It may be artificially procured of a vivid and rich blue; but always having a greenish cast.

The upper figure gives the most usual appearance of it upon the rock. *The specimen figured below* was, when first gathered, of the beautiful blue cast of the fresh broken *inner part*; probably some Oxide of Iron is the cause of the outward change of colour, which, however, doest not penetrate far into it. The best Crystals are formed artificially. The primitive form is a parallelopiped with oblique angles:—see *the bottom outline*. *Spec. Grav.* 2·19.

Analysis by Mr. Kirwan:

Oxide of Copper	40
Sulphuric Acid	31
Water	29
	100

Although water is necessary to this substance, as well as to the Sulphates of Iron and Zinc, and might be considered in sufficient proportion to make them aqueous species; yet we rather think the specific appellation best given from the Sulphuric Acid, as most essential to their nature.

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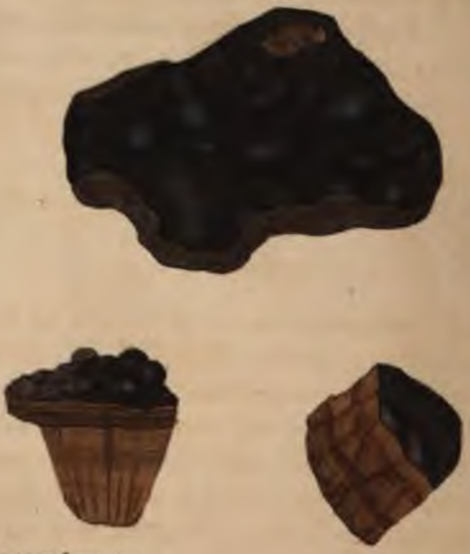

Feb. 1 [illegible] published by Js Sowerby London.

TAB. CCCLII.

STANNUM oxygenizatum.

Hæmatitic Oxide of Tin. Wood Tin.

Class 3. Metals. *Order* 1. Homogeneous.
Gen. 5. Tin. *Spec.* 1. Oxide.
Div. 2. Imitative.

Syn. Fibrous Tin Stone, Wood Tin Ore. *Kirw.* 2. 198.
Etain oxydé concrétionné. *Haüy*, 4. 147.

The peculiar hæmatitic structure of this Ore of Tin, or rather the radiated structure that often attends the Hæmatite or Iron Ores, having a woody appearance, has given rise to the name, which serves very well upon the whole, although we do not think it very apt, considering its hardness and specific gravity. In its usual state it may most readily be distinguished from Iron by merely weighing it in the hand.

The upper specimen is magnificent as to size, being very rarely found half so large. It was lent me for this public use by Edward Hawkins, Esq., who possesses a fine assortment, and is inferior only to one in the Greville collection.

The right hand lower specimens are of the most usual size; *the left hand one* shows the concentrating radii with the outer coat bubbled as it were, and according with the general appearance of *the upper specimen.*

It is perhaps an extraordinary circumstance that this substance is not known to be attached to any rock, and it was once thought that only one or two specimens were to be found in which it was attached. Mr. Day thought he had one, which I now possess; but I find that its supposed great value now only consists in its being that identical specimen; for, upon examining it particularly, I find it has only the characters belonging to Iron Hæmatites, viz. that of being soft enough to show the streak upon being scratched, and which is red, whereas the Wood Tin should not vary in the colour of the streak, if it can be scraped at all; also of becoming strongly magnetic when heated by the blow-pipe upon charcoal, whereas Wood Tin scarcely becomes magnetic, but is reduced to pure Tin. Klaproth observes that this Ore contains more Tin than any other Ore of the same Metal. It is found in Cornwall at St. Denis, St. Columb, Alternon, &c. *Spec. Grav.* 7·29.

Analysis by Klaproth:

Tin	77·50
Oxygen	21·50
Silex	0·75
Oxide of Iron . . .	0·20
	100·00

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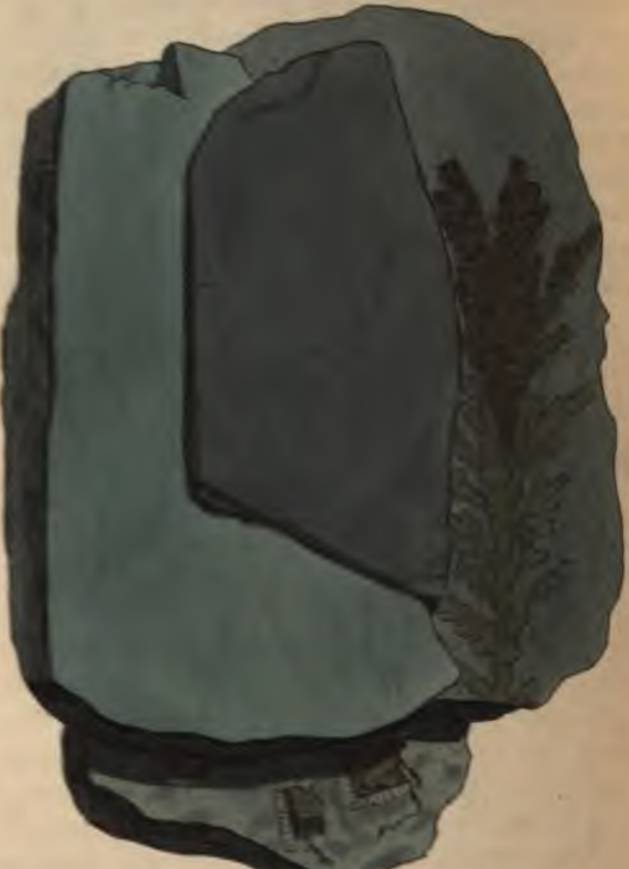

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TAB. CCCLIII.

Common Argillaceous Slate, or *Schistus.*

Class 2. Earths. *Order* 2. Aggregate.

Syn. Schistus. *Linn. Syst. ed.* 13. 3. 37.
Argillite. *Kirw.* 354.
Argile schisteuse. *Haüy*, 4. 446.
Clay Slate. *Jameson's Mineral.* 1. 334.

The Slate commonly known as of a slate-grey colour is found in many places in Great Britain, from Penzance in Cornwall, through Wales and Westmoreland to the Calton Hill in Scotland, where there are primitive rocks. Between the different beds of Slate which lie in that direction are beds of Lime-slate, as at Plymouth-Dock, where one side is Slate and the other Limestone. Many parts of Scotland, and Wicklow in Ireland, abound with this substance, and some afford much variety. Lord Penryn's, at Nanfrancon near Bangor, is quarried in large quantities for London; the dark grey and lighter sorts are used for slating houses, and the less fissile ones serve for posts, or turning into candlesticks and fanciful ornaments. Coat buttons have been made of Slate, which proved very durable, and often suited well with a dark, or light brown, or gray, or mottled coat.

The front figure shows the durable Slate of Cornwall, which is used in as thin and light plates as any. It has a close, glossy, and nearly even appearance, and consists chiefly of Chlorite with an intimate mixture of Quartz, upon which it depends for its durability, as it probably does upon the *different* degrees of oxidization of the Iron contained in it for the shades of colour. Killas and all the schistose rocks in Cornwall are only different varieties of this substance, depending upon the Talc, Quartz, &c., being somewhat varied in quantity and texture; which variation may easily be supposed innumerable, but which may without much practice be recognized, although the word Killas seems to have caused some confusion.

The lowest figure is Slate from Ingleton*, in Yorkshire; and, like the Irish, Welsh, and Scotch Slates, often have cubes of Pyrites in them.

The present specimen is one of that sort, and has a newly-noticed substance on two sides of the Pyrites. We have mentioned it to many friends, but can neither gain intelligence about it, nor learn whether it is to be had in better specimens. This is somewhat like Asbestus, the fibres being at right angles with the Pyrites on two sides only.

The left hand is a specimen from Westmoreland.

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* This place is famous for dendritical Pyrites on the Slate, forming as it were golden trees (see *right hand figure*).

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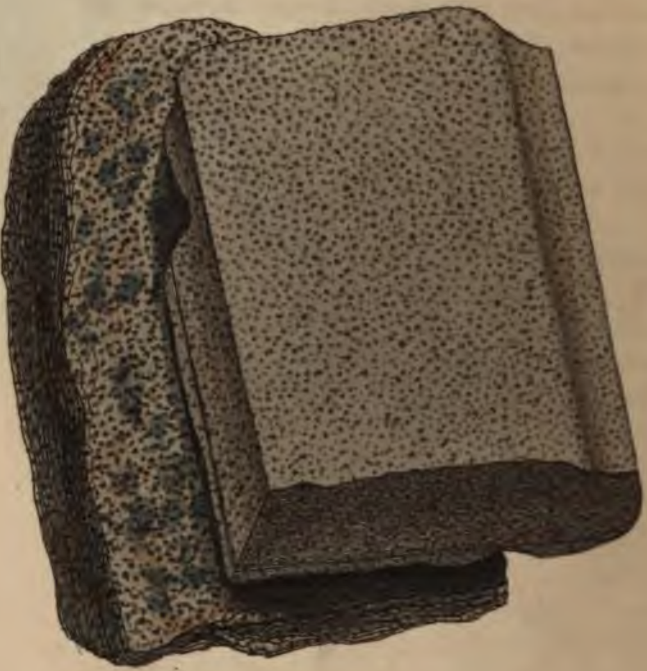

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TAB. CCCLIV.

It is not always that the substance which contains the same ingredients as Slate, has the schistose fracture, as appears by its being turned in a lathe on some occasions. It is rather remarkable that the Snake-Stone from Ayrshire is a variety of the same substance as Slate, but is not generally recognized to be such, on account of its possessing the slaty fracture when in large pieces only, not showing it when broken small. It is imported as a valuable and truly useful article in many branches of manufacture; as for smoothing copper, marble, &c. For the latter it is formed into the shape of mouldings, as in the *upper figure*. This substance is known in a great measure by its being so regularly spotted, which, perhaps, has obtained it the appellation of Snake-Stone, by which it is well known among workmen. The light brown colour is analogous to the unspotted part of a snake's skin. I have gathered nearly the same in Cornwall, and some varieties are to be found, with the dark spots beautifully relieved by satiny Talc of a looser texture :—see *the under figure*. I have specimens nearly like it, but more indurated, from Keswick. The black spots seem to be Hornblend, Chlorite, or Manganese.

In *the upper specimen* the black is generally of an equal hardness and texture with the rest, or it would not suit the workmen. When a stone from any quarry is found to have the proper qualities, it becomes of much consequence, and is a valuable article of commerce.

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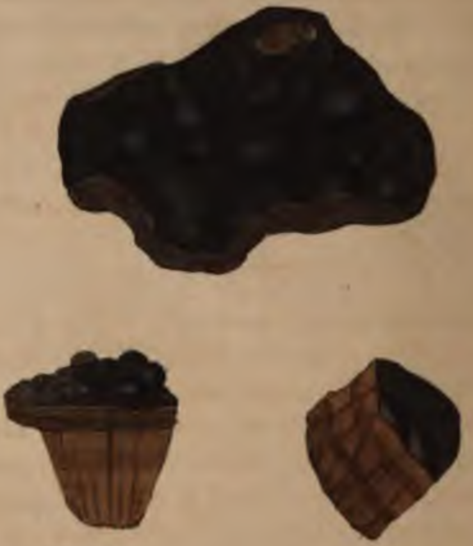

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TAB. CCCLV.

Siliceous Schistus, Hone-Stone, or *Novaculite.*

Syn. Novaculite. *Kirw.* 1. 238.
Whet Slate. *James.* 1. 331.
Argile schisteuse novaculaire. *Haüy*, 4. 448.

Hone-Stone is generally considered as a foreign substance, said to be imported from Turkey; and has heretofore been always mentioned by authors as such. I can only say that we have a substance so nearly resembling it in England, that it may very fairly be considered as the same; and therefore I esteem the Hone a product of our own country. It is more or less an attendant upon Slate. Its colour is grey, light greenish grey, buff, and nearly white; its fracture splintery. I have it from the Carnarvonshire hills, North Wales, (see *the upper specimen*) of a cream-colour, like what is usually called Turkey Hone. Such is much esteemed by the cutlers at Sheffield, and is sold in proportion to its quality. A piece of about six inches in length, fit for sharpening a razor, was thought so excellent as to be worth a guinea. Many varieties of Hone-Stone are found near Conistone, in Lancashire, and are sometimes so prettily marked with dendrites as to have gained the appellation of Mocoa Stones*. The greenish Whetstone with

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* Mocoa stones from Germany are perhaps coloured by Bitumen, but those from the East Indies by Manganese. In the first, the dendrites are apt to wear out, in the latter they are durable.

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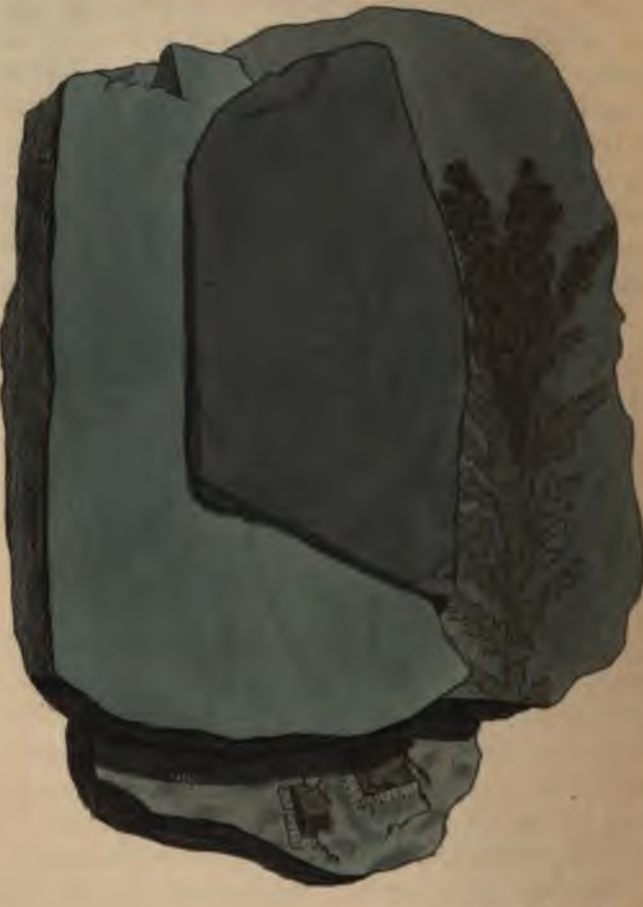

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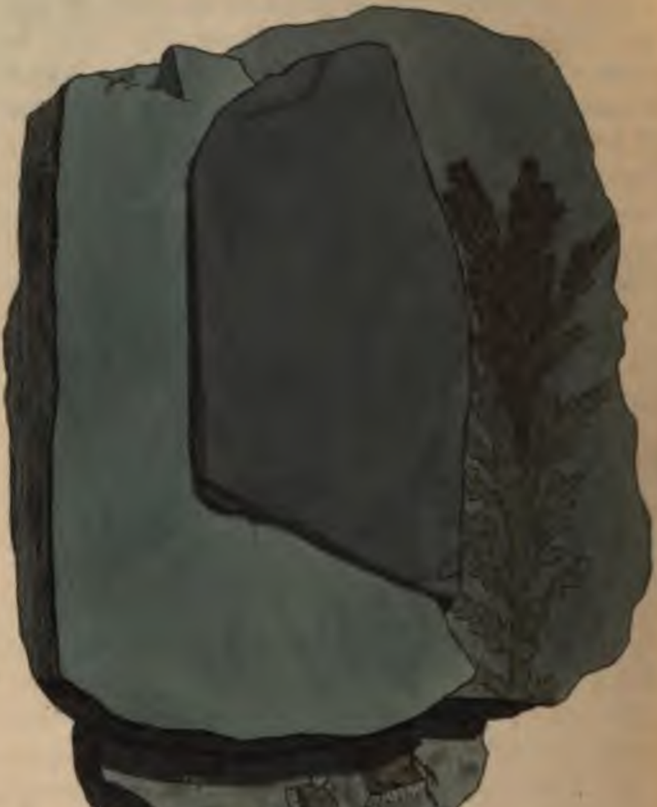

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TAB. CCCLVI.

SILEX piceus.

Glassy Pitchstone.

Class 2. Earths. *Order* 1. Homogeneous.
Gen. 4. Silex. *Spec.* 7. Pitchstone.

SYN. Pitchstone. *Kirw.* 1. 292.
Pechstein. *Emmerl.* 1. 262.
Petrosilex résinite. *Haüy*, 4. 386.

THESE Stones are so like Pitch in general, that no one could mistake them, except when they vary in colour and have a glassy appearance, as is sometimes the case. The fracture in some fine specimens is large, concentric, sharp, and conchoidal, in others more splintery. We figure one of the latter, which includes Petuntse, or Feldspar, and also has more or less of a glassy appearance. This, taken in the whole, would be called Pitchstone Porphyry. It came from Arran in Scotland, and contains Alkali. Hence it nearly approaches common glass.

Quartz is so extremely likely to vary in its appearance, especially when chemically combined with colorific or other matter, that it may be considered as liable to as many varieties as any other known substance. Thus it varies from Calcedony or Agate, to Cachalong and the various Opals :—see *tab.* 111. and also to Jasper, wax-like Hornstone, Flint, and even Pitchstone. Under the term Pitchstone may be included those siliceous stones which are fusible and resemble glass, as they can scarcely be separated but by fancied differences (as the usual appearance of Pitch may be called either glassy or pitchy). There are, however, distinctions in some of them, which may be founded on geological principles, as their being chiefly combined with either Lime, Magnesia, or Alumine and Alkali, which often, perhaps, depends upon the kind of rock they are formed in: the colouring matter being either Bitumen, Manganese, or Iron, in different states of oxygenization and quantity.

Pitch is of different textures, and has a fracture more or less large or small, conchoidal, or glassy, and lighter or darker in the splintery illinitions, depending on the degree of heat to which it has been subjected. Pitchstone varies as much; therefore, the present specimen may be called a Pitchstone having a glassy appearance, with a rather small conchoidal and sharp splintery fracture. As it includes Feldspar, which spots it in some parts, it may be called Pitchstone Porphyry. It is generally harder than glass, or will scratch glass as Flint does. We are not sure that even Bitumen enough may not be found hereafter, to mark its analogy with Pitch very completely.

The present specimens were obtained from Arran, where the substance seems to be found in veins in a Porphyry rock, and to pass into the more usual appearance of Pitch. It has occasionally a basaltic aspect.

The visible and chemical characters of Obsidian agree so closely with those of Pitchstone, that they must surely be considered as the same species.

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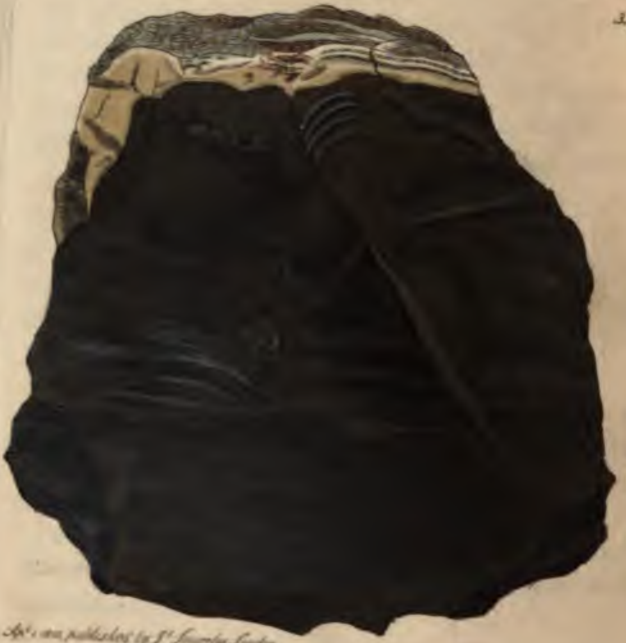

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TAB. CCCLVII.

Steatitic Pitchstone.

I WAS favoured with the present specimen from a vale near Clowance Park, in Cornwall, by Phil. Rashleigh, Esq. The outer white parts are said to be Tungstate of Lime, a very rare substance in Great Britain: there are also some Asbestus and Ruby Copper about it. One great curiosity attendant upon these substances is, that they naturally contain an Alkali, which formerly used only to be procured from vegetables: the great discovery of the basis of Potash and Soda, made by Mr. Davy, has thrown a great light on these and other substances, as to their changes and appearances, which we need no longer esteem positively volcanic; since the powerful agency of motion, with the attraction of these bases for oxygen, may give an effect which we here see to be analogous to the power of a glass-house furnace. These discoveries thus become of much more consequence, as they lead towards the elucidation of what we were before totally ignorant of.

The fracture is more or less conchoidal, like Pitch. It is as hard as Quartz and nearly as brittle as Glass; and, perhaps, stands next to Cement-like Quartz, *tab.* 219, but we do not know that the latter has any Alkali in it.

Klaproth found Pitchstone to contain

Silex	73·
Alumine	14·5
Lime	1·
Oxide of Iron	1·
Oxide of Manganese	0·1
Soda	1·75
Water	8·50
Loss	0·15
	100·00

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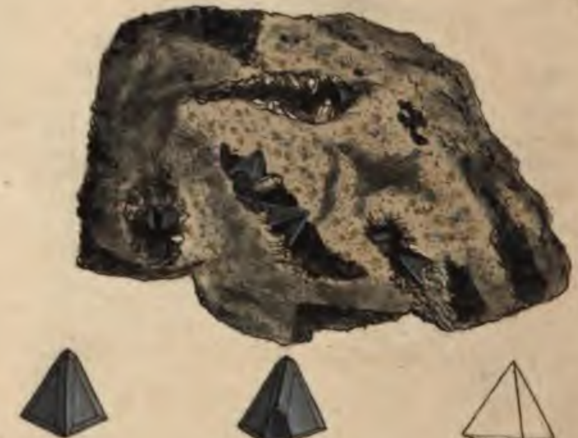

Ap.l 1 1810 published by J. Sowerby London

TAB. CCCLVIII.

CUPRUM Sulphureum Arsenico-ferriferum.

Arsenico-ferriferous, or *Grey Sulphuret of Copper. Fahl-ore.*

Class 3. Metals. *Order* 1. Homogeneous.
Gen. 12. Copper. *Spec.* 7. Arsenico-ferriferous sulphuret.

SYN. Gray Copper Ore. *Kirw.* 2. 146.
Fahlerz. *Emmerl.* 2. 238.
Cuivre gris. *Haüy*, 3. 537.

GREY Copper has been found in several Mines in Cornwall. I have a neat little specimen in Tetraedrons from Tavistock, in Devonshire, by favour of John Taylor, Esq.

The present very neat specimen came from North Wales, and has many characters in common with the vitreous Copper Ores found in Cornwall: it is, however, more brittle, and differs in its crystallization. This Ore varies in its contents, the specimens from Cornwall having only Copper, Iron, and Sulphur; while the foreign ones sometimes contain Silver, Arsenic, and Antimony. Its neat and smooth grey steel-like appearance makes it tolerably distinct. It is more shining than the usual vitreous Ore in the fracture, which is mostly small, conchoidal, and bluntish.

The present specimen has but little variation in external colour, and, though easily scraped with a knife, is rather harder than the common vitreous Copper.

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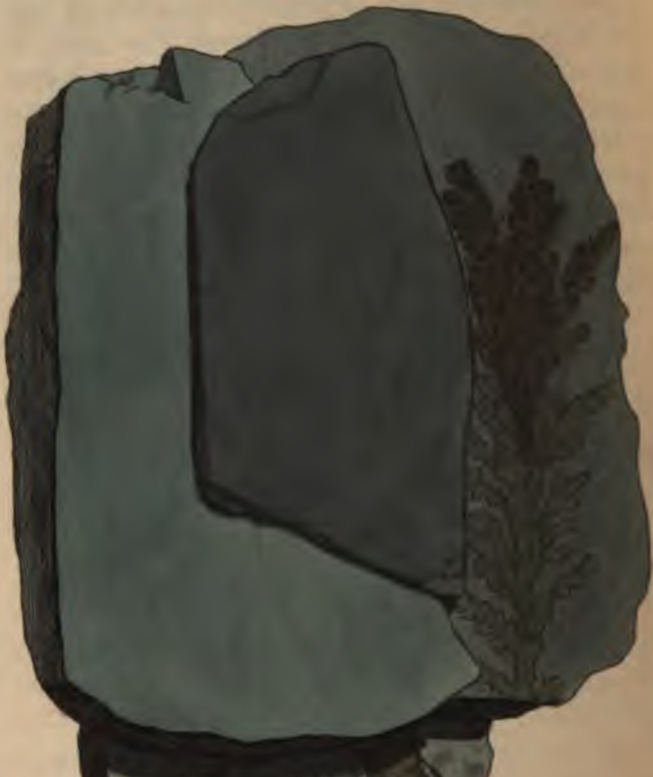

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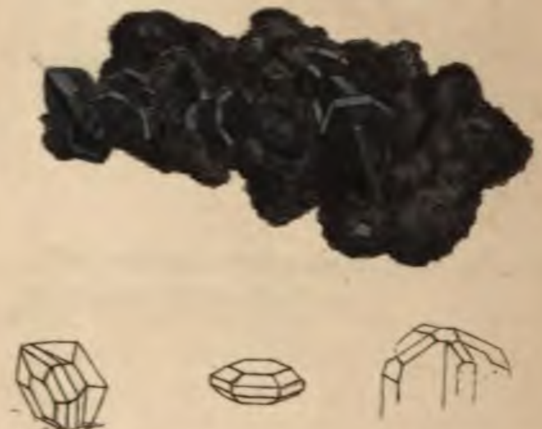


Ap 1 [illegible] published by Jas Sowerby London

TAB. CCCLIX.

CUPRUM sulphureum.

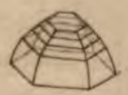
Subsulphuret of Copper, or *Vitreous Copper Ore.*

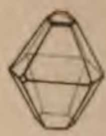
Class 3. Metals.	*Order* 1. Homogeneous.
Gen. 12. Cuprum.	*Spec.* 4. Subsulphuret.

Syn. Vitreous Copper Ore. *Kirw.* 2. 144.
Kupferglanz. *Emmerl.* 2. 222.
Cuivre Sulfuré. *Haüy*, 3. 551.

This is one of the richest Copper Ores, and is very abundant in Cornwall. Its crystals usually partake of the hexaëdral prism. Thus we have very short truncated hexaëdral pyramids placed upon very short six-sided columns, with many varieties on the same specimen.

The present specimen at one end has these crystals mackled, which I suspect has not been mentioned before: see *the right hand figure*, which consists of two crystals like the middle one joined together. Some of the crystals on the specimen approach the cross, like *the left hand figure*. I have a good specimen, with many nearly such, but did not think it necessary to give the whole. The one here figured came from Cooks-Kitchen, Cornwall.





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TAB. CCCLX.

THIS variety of vitreous Copper Ore is also found at Cooks-Kitchen, in Cornwall, but is very rare. I have received it among other favours from Mr. J. Taylor of Tavistock. It is worthy of remark, that the crystals are of a large size to what is usual, and the hexangular pyramids, which are placed base to base, are more or less elongated: thus has Nature sported with the crystallization, so as to prevent our measuring with certainty the angle of incidence at their mutual bases. Some of the crystals have the regular bevellings of Haüy, perhaps, not to be measured with certainty; and some of the crystals have many lateral faces, so as to give roundness, thus also to elude measure. The fracture is mostly irregularly glassy, or minutely conchoidal. This Ore is easily scraped or scratched with a knife to powder, but is not brittle. The colour is iron-grey within, darker on the outside: some specimens have the blue watch-spring lustre and iridescence. *Spec. Grav.*, according to Kirwan, 4.129.

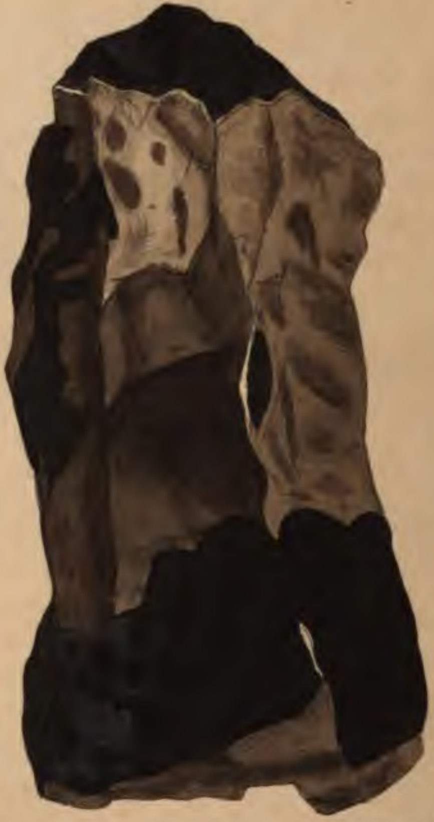
By analysis it is found to contain:

Copper	78·5
Iron	2·25
Sulphur	10·5
Silica	0·75

The matrix is a mixed sulphuretted Oxide of Copper and Iron[*] with Quartz, through which there runs a vein of the vitreous Copper Ore with the crystals.

[*] The black Copper Ore of *Kirwan*, 2.143. Kupfer Schwartze of Werner. This may, perhaps, serve as a sufficient specimen for this work.

This dusty or earthy ore generally accompanies the sulphurets, or other copper ores. It is yellowish, reddish, or brownish black. Scarcely soils. Is rather heavy. Contains about half its weight of copper; but, from being generally produced by the decomposition of the other ores of copper, it of course varies much.



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TAB. CCCLXI.

HYDROGEN Bitumen.

Inspissated Bitumen, or *Mineral Tar.*

Class 1. Combustibles.	*Order* 1. Simple.
Gen. 1. Hydrogen.	*Spec.* 2. Bitumen.

SYN. Mountain or Mineral Tar. *Hatchett in Linn. Trans.* 4. 131.

THIS variety represents Tar so much as to be well entitled to the appellation of Mineral Tar. Naphtha and Petroleum lead equally to this and to the soft elastic Bitumens, branching off on one side to the elastic and on the other side to the unelastic, of which this specimen is one. It is inflammable, and in other respects, as to odour, &c., it is like the others. It is found, apparently in the greatest abundance, in the neighbourhood of Dumbarton, whence the present specimen: it is otherwise very rare. It is remarkable that the Iron-stones (Septaria) are the chief deposit of it. The present specimen is part of one, and I have a Coal Septarium not much unlike *tab.* 61, *upper figure*, that has this soft substance in it. I have also a specimen among Quartz and Yellow Copper Ore from Carrharac in Cornwall, with some in a more brittle state, so as to take the impression of the finger nail, but partly breaking at the same time with a bright pitchy fracture. I have some also in Copper Ore from Lancashire that unites the two; it is accompanied with dark Limestone.

This substance is dark brown, has rather a greasy appearance, scarcely sticks to the fingers, and looks nearly like the dark or dirty coom of cart-wheels, and as it were lies about the divisions of the Septarium, or in the holes of the other specimens. Smell, when a little heated, as usual to the Mineral Bitumens; by some thought agreeable, though very different from Vegetable Tar. Breaks easily with a rugged fracture; burns with much smoke; is not soluble in Spirits of Wine.

Mineral Tar and Pitch are found in various states in the islands of Trinidad and Barbadoes*, but I do not know that any elastic Bitumens are found there.

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* See Mr. Hatchett's admirable account in the Transactions of the Linnean Society.

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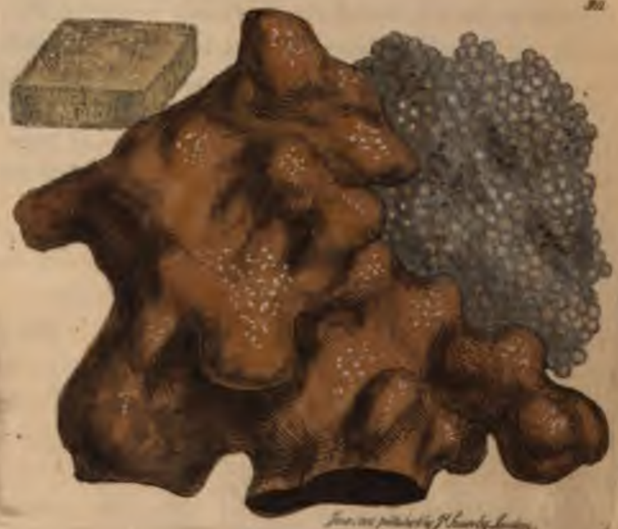

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TAB. CCCLXII.

SILEX quartzum arenaceum.

Siliceous Sand.

Class 2. Earths. *Order* 1. Homogeneous.
Gen. 4. Silex. *Spec.* 1. Quartz.

THE Sandstone of Fontainbleau is well known to crystallize in elegant groups of very neat rhombs, that represent the inverse Carbonate of Lime, containing one third or more of Carbonate of Lime, which appears to guide the formation*. I have met with nothing like it as yet in Great Britain. One of my sons, however, some six or eight years since, brought me some flatted Cubes or right-angled Crystals, which he found among sand said to come from the neighbourhood of Ryegate. Some were partly cemented by a little Carbonate of Lime, and others were so loose that they could scarcely be handled without breaking. As I know of nothing similar, I represent it here as a rarity in Great Britain. I also add a variety of Sand which somewhat resembles the Roe of Fishes, or large-grained Ketton-stone, or Pisolithus. It was brought me by Lady Wilson, who found it at Charlton, and is likewise cemented by some Carbonate of Lime. Something like it is also said to be found at Fontainbleau.

The darker and irregular specimen is from Oxford, and was taken out of the Ochre Pit. I have a large mass nearly of this description, found in the mixed Lime and Sand Stratum under the Thames at Rotherbithe, of which I do not know that any one else has preserved a specimen. This and others are more or less cemented by Lime and Oxide of Iron. We have, therefore, three remarkable formations in the Sandy Stratum, which may prove highly instructive.

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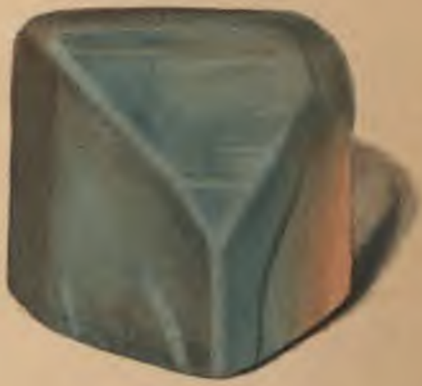
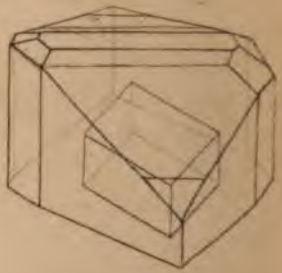
* Exotic Mineralogy, *t.* 1. See Proposal on the cover.

441.





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TAB. CCCLXIII.

ARGILLA Topazius.

Topaz.

Class 2. Earths.	*Order* 1. Homogeneous.
Gen. 1. Argilla.	*Spec.* 11. Topaz.

SYN. Occidental Topaz. *Kirw.* 1. 254.
Topaz. *Emmerl.* 1. 73.
Topaze. *Haüy*, 2. 504.
Borax, gemma nobilis Topazius. *Linn.*

TOPAZES have been found in the island of Ceylon, the Brazils, Bohemia, Saxony, Cornwall, &c. In Lesser Asia a rose-red variety was discovered by our good friend Mr. Hawkins before mentioned in this work; and since that they have been found in New Holland, and in Scotland. The specimen figured is from Cairn-Gorum, and was lent me by its kind possessor Thomas Allan, esq. It is the more curious, as part of it is of a fine light blue colour*, and part cinnamon-coloured, with a beautiful soft glowing warmth; and the disposition of the two colours seems almost to explain the nature of the crystallization. I thought therefore it would be instructive to give a figure of the base of the crystal, showing nearly the form the colours are dis-

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* Topazes are of different colours, from deep wine yellow through reddish yellows to greenish and rarely blueish;—also colourless and transparent.

n. See *the left hand lower figure. The right hand* *rical figure* shows the faces of the crystal, the top ttom being primitive, with which the fracture agrees. gure is about the size of a crystal, from the same n the possession of R. C. Fergusson, esq. which has ne colours as the other, though more dilute. This is s peculiar to the Scotch Topazes, as may be verified er; for they may prove to be more common than is now expected. The people that gather them, often call the Cairn-Gorum Quartz by the name of Topaz (being a stamp of value); and they are sold indiscriminately. This crystal, which bears the marks of many a violent storm on its worn edges, has been broken through the primitive base transversely to the column, and is fractured in the laminæ, showing the order of the prismatic colours very well; and by pressure these colours are spread wider, which shows that there is a great degree of elasticity in the laminæ.

The geometrical figure is to show more distinctly the faces that are in the principal figure, which is rather remarkable for not having the faces so constantly opposite as they generally are in Topazes. Between the large pentangular face (*n* of Haüy) and the primitive apex, there is a parallel face, not mentioned by Haüy, and perhaps one opposite, but so small that, as the crystal is rounded by attrition, we are not sure it is there. At the lower corner is the triangular face (*c* of Haüy), on the nearest side, but I think not on the opposite; but it is marked in the outline to show where it would come. The two faces on each acute side of the prism are primitive, on the top of which a want of increase forms two faces (*o*, *o*, of Haüy).

The larger four sides of the prism are the faces (*l* of Haüy). The figure within the outline shows the position of the primitive faces and fracture. The obtuse angle of the base is 124° 22′ according to Haüy.

The value of Topazes depends much on their colour and lustre. It is supposed to be the hardest substance known, excepting Diamond and Corundum. Their hardness, fracture, and brilliancy may have confounded them with Diamonds; and it is said that Saxon Topazes are heated to give them a white transparency*, and are then actually sold for Diamonds—it is even suspected by some that the reputed Portuguese Diamond may be only a Topaz. Spec. Grav. 3·464—3·564.

The Saxon Topaz analysed by Vauquelin afforded him

Alumina . . .	49
Silica	29
Fluoric Acid . .	20
Loss	2
	100

The Brazilian gave

Alumina . . .	47
Silica	28
Fluoric Acid . .	17
Oxide of Iron . .	4
Loss	4
	100

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* I believe the same is done with some Diamonds. It is very usual with the dark Cairn-Gorum Crystals. See Descr. *tab.* 102.

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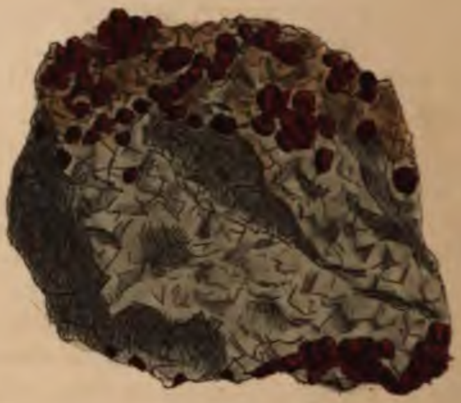

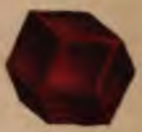

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TAB. CCCLXIV.

SILEX granatum.

Garnet, or *Pyrope*.

Class 2. Earths. *Order* 1. Homogeneous.
Gen. 4. Silex. *Spec.* 26. Garnet.

Syn. Pyrope. Le grenat granuliforme de Bohème.
Haüy, 2. 555.
Edler granat. *Emmerl.* 3. 246.

Mineralogists have made a division in Garnets, (if I may so express myself,) by considering Pyrope as a distinct species, when its only distinguishing character is its being found in irregular pebbles and not crystallized. Lapidaries long since used to consider Scotch Garnets of a peculiarly brilliant lustre as different, under the particular appellation of Scotch Garnets. I have some of these cut when in fashion about thirty years since, and my friends have sent me some in the rock under the name of Pyrope. It is perhaps one of the most striking examples of nice discrimination that may ever happen:—these may be distinguished by the Scotch Pyrope having the lustre inclining to fine red, and the other to orange*; and it should seem that they can scarcely be distinguished when asunder.

Dr. Babington was so good as to favour me with the Pyope from Hungary. It is remarkable that it should never be found crystallized, which is one of the specific characters.

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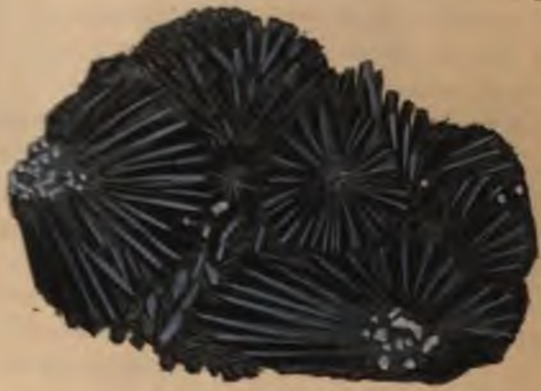
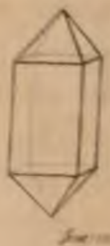
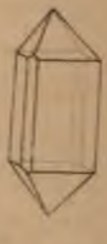
* See *red* and *orange* in my Elucidation of Colours.

Our substance is as remarkable for being rather particular in the crystal, being the proper Garnet Dodecaëdron with bevillings on each side of the edges, which is not usual in common Garnets. See *the right hand figure*. This is no less remarkable for some being truncated at those solid angles, or alternate corners, where three edges meet, I believe not before observed. If analysis should show any material difference, this will properly constitute a new species. The crystals are in a gangue of Quartz more or less stained with Oxide of Iron, part of it having a dingey greasy aspect. The specimen was sent me from Ely, Fifeshire. It is said that the Pyrope is found in the sand on the sea-shore near the same place, and probably derived from the neighbouring rock.—Might not loosened specimens of this be found on the shore worn so as to obliterate the appearance of having been crystallized? and may it not also happen so in general with those of Bohemia?

365.







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TAB. CCCLXV.

ANTIMONIUM sulphureum.

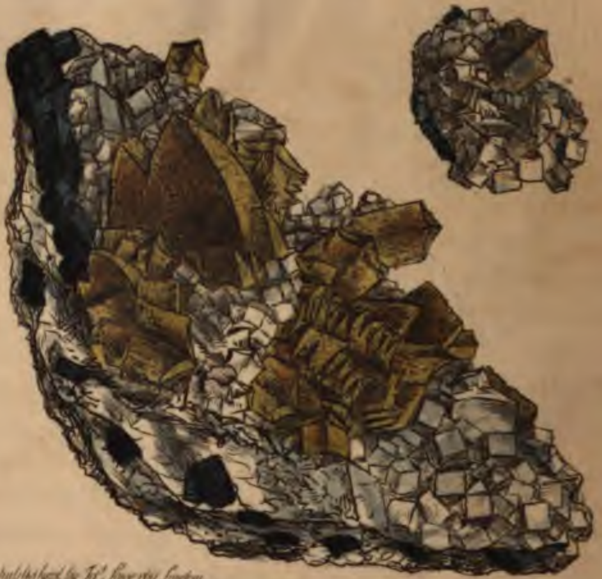
Sulphuret of Antimony.

Class 3. Metals. *Order* 1.
Gen. 2. Antimony. *Spec.* 3. Sulphuret.
Div. 1. Crystallized.

Syn. Sulphurated Antimony. *Kirw.* 2. 246.
Grau-spiess-glanzerz. *Emmerl.* 2. 468.
Antimoine sulfuré. *Haüy*, 4. 264.

In Cornwall is found this stellated and spicular variety of Sulphuret of Antimony. It seems to have the fracture which is attributed to it by most authors, and is likely to belong, as to its crystallization, to the geometrical figure beneath. It is curiously interspersed with small rhombic crystals of Carbonate of Lime. This species is sometimes of a fine polished steel lustre, and sometimes beautifully iridescent. It may easily be scraped with a knife. The powder is grey. It is easily fusible, wholly evaporating in white fumes.

166.



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TAB. CCCLXVI.

FERRUM sulphureum.

Sulphuret of Iron.

Class. 3. Metals. *Ord.* 1.
Gen. 8. Iron. *Spec.* 5. Sulphuret.
Div. 1. Crystallized.

THIS singular formation of Pyrites, although of old in my collection, is, I believe, new in description. Crystallographers say very little of the concave or convex rounding of crystals of any sort, although it is often a strong characteristic of some substances, especially the convex, as in the Diamond:—*Crystallography, part* 2d, and Galæna, *tab.* 131 of this work, &c. The concave is, however, much more rare: indeed the appearance is so extraordinary, that it has been looked at more with an eye of wonder than investigation. The present specimens are examples of this concave formation, and of the tarnish and iridescence which partly disguise substances. They are nearly the same within, although the smallest is so light-coloured outside, and has a yellow, red, and blue iridescence; and the other nearly a fair yellow metallic tarnish. This latter specimen also shows the convex formation, which is so great a contrast to the former that it is altogether a wonderful group, whether caused by the solvent or quantity of material attracted for aggregation. It seems to be an accumulated repetition of this formation that represents the Cockscomb of the following table. We have, however, still some very valuable and extraordinary specimens that primarily lead to this peculiarity, of which we shall be happy to make observation, as they are truly instructive.

TAB. CCCLXVII.

Cockscomb Pyrites.

I BELIEVE this odd variety is peculiar to England. Kirwan (1st edit.) speaks of it as crystallized in small cubes or pyramids, united to a common basis "like cockscomb." Dr. Babington and some others mention Cockscomb Pyrites, but some of our late mineralogical authors take no notice at all of it. It is said to be rare, excepting in Derbyshire; and as it is often very liable to decomposition, many cabinets that once possessed it are now without it. Mrs. Gent of Devizes was so good as to offer me the use of a finer specimen, that is to say, a specimen with larger cockscomb crystallizations. Both that and mine are probably in a state of slow decomposition, for they are dullish, and have a sulphureous scent, I suppose on account of the Sulphur passing from them. The smoother cubical pyrites and the striated have been considered by some as distinct species, because one is more apt to decompose and fall to pieces, as these and most others often do: this is therefore scarcely a sufficient distinguishing character; and I have most varieties in the changes by oxidizement, from the common brown to the red oxide, and I have British and Irish specimens in cubes, both smooth and striated, resembling those from the West Indies called Sargestum (about which I have had many inquirers); and I think, by various specimens which I possess of Oxidized Iron, that Pyrites under certain circumstances loses the Sulphur and becomes a solid red Oxide. The present specimen is on a gangue of Carbonate of Lime with some metastatic Crystals more or less stained or coloured by the red Oxides. Thus they change by degrees to distinct species at each extremity. This is perhaps a good example to show the difficulty of arrangement, and the infinite varieties; and that we should be cautious of indulging too much in little distinctions.

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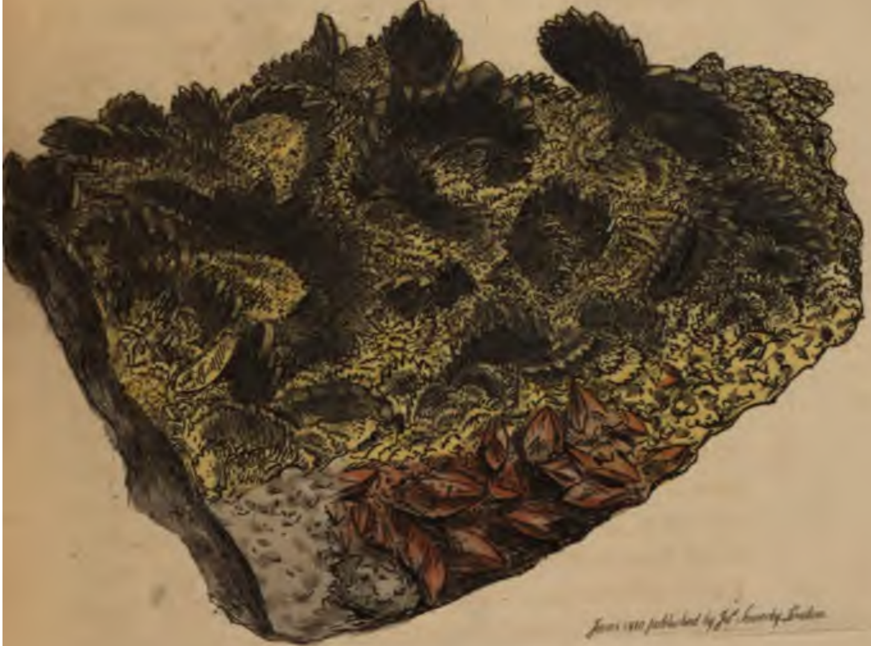

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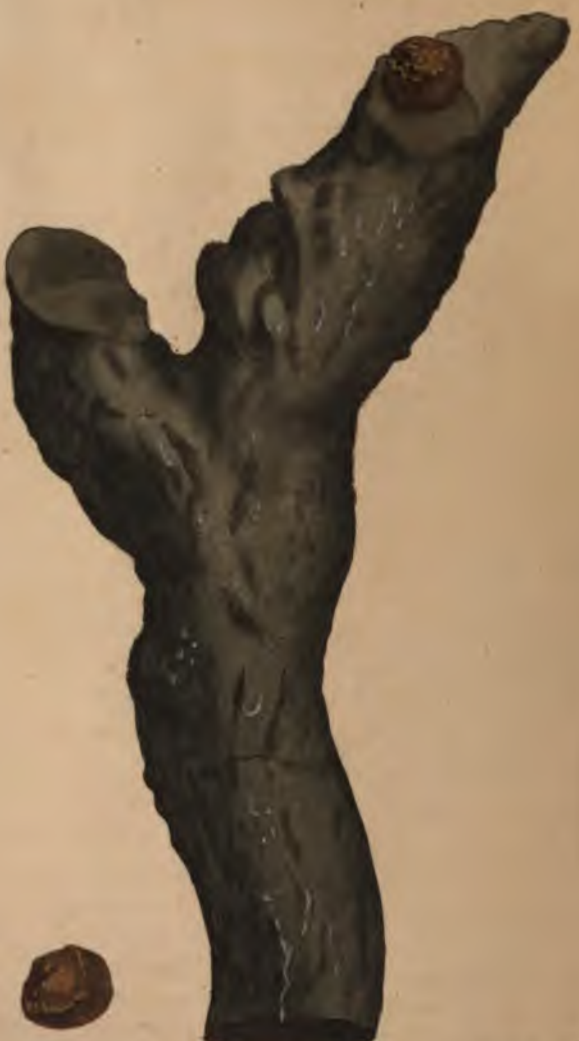

[illegible] by J. Sowerby Lond.

TAB. CCCLXVIII.

FERRUM quartzosum.

Siliceous Iron-Stone.

Class 3. Metals. *Order* 3. Mixed.

MANY places afford Iron-stones, Geods, &c. See Descriptions and Plates 106 and 107 *. The present specimen is from under the Thames at Rotherhithe, where the Tunnel is perforated, in a mixture of Sand, Sandy Lime, &c. It is remarkable for its branching, and in some specimens so much so as to represent the more entangled roots of trees. It is internally of a raw brown umber colour, nearly compact appearance, and may be scratched with a pin, giving a whitish streak: externally more or less rugged, with Lime and Sand attached to it. I have only one instance of its being found elsewhere, and that is a larger specimen in the possession of Mr. Smith, who is so well known to be conversant with most of the Strata of this Island, who found it in Wiltshire. The Iron in this specimen is in a low state of oxidizement, and is intimately combined with Silex and other earthy matter, as with a little heat it becomes magnetic. Some of my specimens are the more extraordinary for having little Geods about the size of hazel-nuts, with a coat or outward crust nearly the colour of the shell of those nuts, and an ochre resembling Roman ochre, more or less loose within them. Thus we have an use for the term or division Imitative, from the resemblance of these to the branches of trees and nuts. In many instances Nature's works are so extraordinary in these productions as to elude the nicest discernment, and teach us that much experience is necessary to prevent error.

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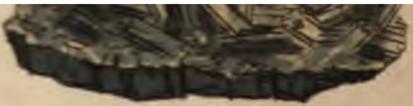
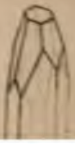
* I omitted one of the usual terms for Iron-Stones, which is Geoda. The term seems to be original with Sir John Hill in his History of Fossils, page 541, where he describes them as "crustated ferruginous bodies, holding loose earthy or arenaceous matter." He has made distinctions regarding more solid coated varieties, &c. as Hetropyra, Empherepyra, &c.





TAB. CCCLXIX.

CALX carbonata.

Carbonate of Lime.

Div. 1. Crystallized.

CARBONATE of Lime is so abundant in varieties and modifications of its crystals, that we shall select only such specimens as show something peculiar or instructive. In the present instance we exhibit it with longer prisms than usual, which help to give it the aspect of Quartz, which is so common with a longish prism. Some specimens, but such are somewhat rare, are not far inferior in lustre and transparency to Quartz, but, like Diamonds and other diaphanous brilliant subjects, would be best understood by comparison. Perhaps the brightest Carbonate of Lime would be, in comparison to Quartz, as cut Paste is to Diamonds; so that even the most experienced must try the coldness or hardness, to help his judgement. The first method would not hurt the Paste or Carbonate of Lime, but the latter would damage them; and specimens have now and then been hurt by trial. We have, however, the form of the pyramid to judge by; for Carbonate of Lime never has been found with the obtuse equiangular six-sided pyramid of Quartz, or representing any of the numerous varieties of it:—thus the structure points out a distinction which, when understood, is discerned in an instant. The present figure, therefore, exhibits not only a rare specimen of Carbonate of Lime, but some varieties in the facets of the pyramids. *The upper figure* is a small group with pointed endings. *The lower figure* has the same faces with lateral additions, and one is terminated at both ends. I have added parts of two other varieties underneath, which occasionally form groups. *The upper right hand geometrical* outline shows one end of a crystal with a narrow face, which is placed upon the acute edge of the pyramid. The next outline beneath exhibits narrow faces on the terminal edges of the prism, with a minute truncation upon the acute angle, making three additional facets to each solid angle: the obtuse end contains three of the primitive faces. I have a group to correspond with the faces of the column, alternating narrow at one end and broader at the other. *The right hand figure* has an equiangular pyramid with a truncated apex, nearly like Haüy's *fig.* 32. This is rare: it is from Derbyshire.

TAB. CCCLXX.

CALX carbonata.

Carbonate of Lime.

Div. 1. Crystallized.

SYN. Chaux carbonatée contractée. *Haüy,* 2. 143.

A RARE modification of Carbonate of Lime from Derbyshire. The faces of the column being alternately broader and narrower at the ends would, if extended, make an acute rhomb, formed by a slight deviation from the law by which the regular hexhaedral prism is produced. The apex is formed by three faces corresponding with those of the equiaxed rhomb, *tab.* 13 and 128, rendered pentagonal, and contracted as it were into narrow facets, by the broader ends of the columnar faces which approach the axis in the direction of the edges of the rhomb; whence Haüy's name. It is generally found more or less covered with a brown crust, and has a roughish aspect given it by a mixture of earthy Oxide of Iron.

The lower figure is less acute, and has also the equiaxed termination: this also is rare, and is coloured a little. Both are upon tabular Sulphate of Barytes.

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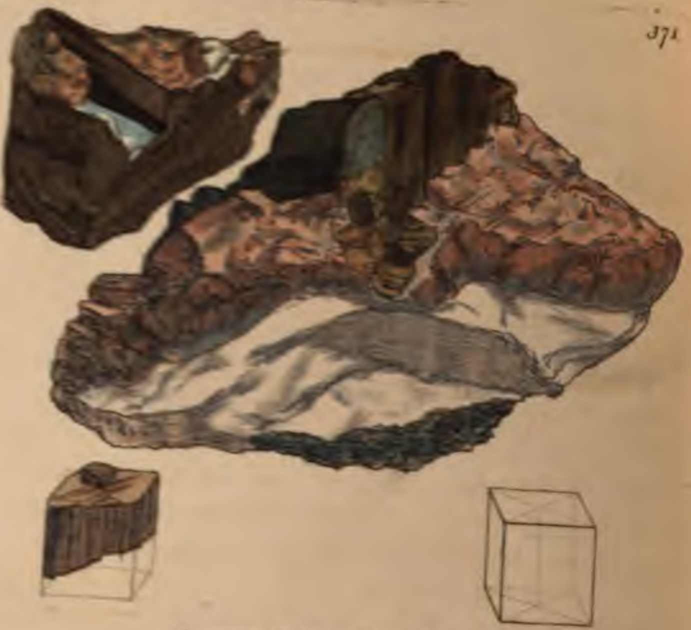

Aug 1 18[illegible] Publish'd by Jas Sowerby London

TAB. CCCLXXI.

SILEX Idocrasis.

Idocrase, or *Vesuvian Garnet*.

Class 2. Earths.	*Order* 1. Homogeneous.
Gen. 4. Silex.	*Spec.* Idocrasis.

SYN. Hyacinthe var. 3 to 8. *De Lisle*, 2. 291.
Vesuvian. *Emmerl.* 3. 314.
Idocrase. *Haüy*, 2. 574.

It is found pretty abundantly in a rock chiefly composed of Mica, Hornblend and Garnet, on Mount Somma. The present specimen was found in the county of Donegal in Ireland, in what has commonly been called the Garnet Rock, which is usually gathered in fragments for the sake of the Garnet, for which this was sent to me; and is curious on account of its colour. The rock is composed of Phosphate of Lime, large-grained primitive gray Limestone, Quartz, in some parts coloured green by Phosphate of Lime*, and Garnet, among which is the Idocrase or Vesuvian of some authors, because it was first known as coming from that neighbourhood. This substance is recognised in the specimen, by its prismatic structure and rather darker colour, although lighter than usual: the Garnet is irregular, somewhat more salmon-coloured, and lighter; the Phosphate of Lime nearly white, and the gray at the bottom is the coarse-grained Limestone of the county, which is generally considered as primitive. The whole rock is certainly a curiosity, if considered in a geological point of view.

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* There are about the specimens several minute crystals of Phosphate of Lime of a green colour, that bear some resemblance to Beryl.

The small upper specimen has the Idocrase of the more usual darker and shining greenish brown, and the Garnet is crystallized; which assists in identifying it.

The crystal of the Idocrase is a rectangular four-sided prism, with the lateral planes streaked and the edges most commonly truncated. It is without its termination in my specimen; but Haüy exhibits a great variety of faces upon the short or obtuse pyramidal apex. It has a resino-vitreous appearance with very little transparency. It is hard enough to scratch glass. Its specific gravity is from 3·0882 to 3·409. Melts with borax into a yellowish glass which appears red while hot.

Analysis of Idocrase, from Mount Somma.

Alumine	16·25	22·25
Silica	42·00	35·50
Lime	34·00	33·00
Oxide of Iron	5·50	7·50
Oxide of Manganese		0·25
Loss	2·25	1·50

Thus we add another substance to British Mineralogy. The specimens were sent, some time since, by Dr. Scott of Dublin, without determining it. I say no more on this substance at present, hoping some time or other to see more perfect crystals, with less confused fracture and terminations, and also of the Beryl-like Phosphate of Lime.

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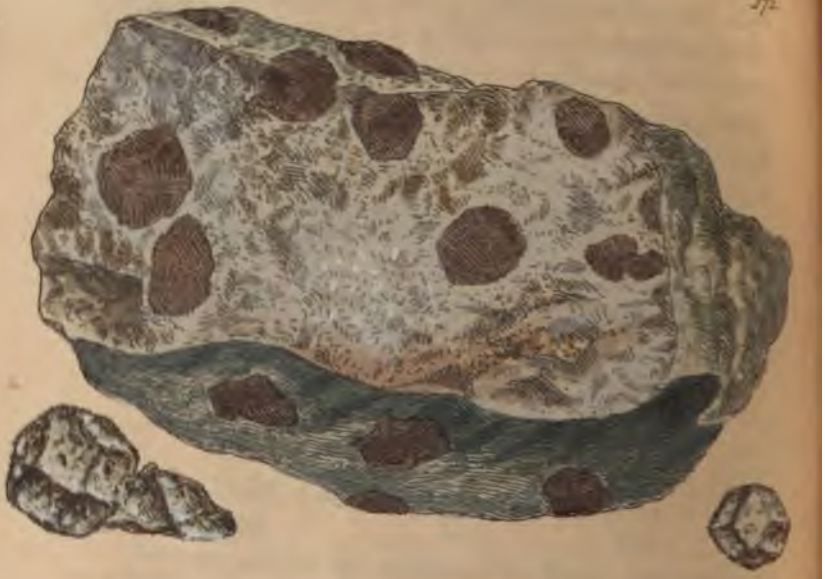

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TAB. CCCLXXII

CALX phosphata.

Phosphate of Lime with Garnets.

Div. 2. Imitative, (fibrous.)

THIS substance, which I have received from the neighbourhood of Aberdeen, by favour of several friends, as a phosphorescent Granite, appears to be a fibrous Phosphate of Lime with Garnets, either decomposing, or not so perfectly formed as usual, but showing plainly the Garnet dodecaëdron more or less interrupted by the Phosphate of Lime. Mr. Jackson, F.L.S., found some at Tierbagger and Culterby, on the Dee side, near Aberdeen, and it is certainly a curious production, not mentioned in any British or even foreign authors. If a fragment be placed on a hot iron or poker, it has the blueish glowing phosphorescent appearance of some of the Fluors. The Garnets in this rock are sometimes so small as to be almost invisible: sometimes they appear only in the form of irregular blotches; but occasionally they are more regular and not attached to the rock, but only fill up a dodecaëdral hollow, and have then the appearance of *the lower figure*, yet seem to be much mixed with the substance of the rock. The Phosphate of Lime is in small bundles of fibres closely matted together, of a pale blueish green in the most compact parts, but whiter and even brownish near the surface, where it is in a decomposing state.

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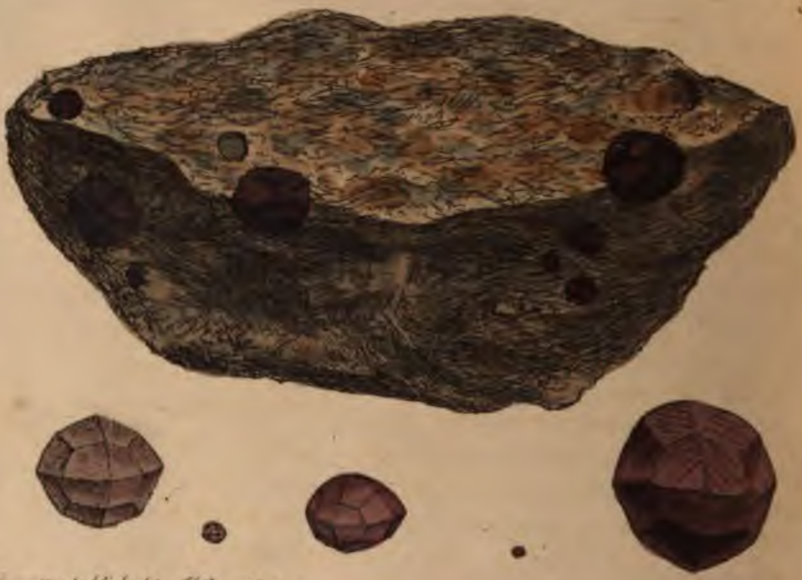

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TAB. CCCLXXIII.

SILEX granatum.

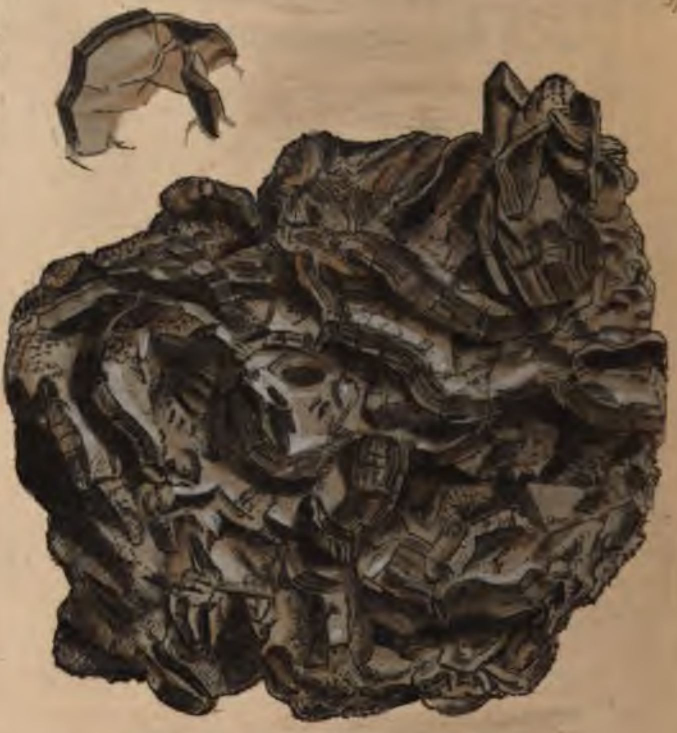
Garnet.

Div. 1. Crystallized. *Var.* Trapezoidal.

Garnets in trapezoidal crystals are not so common as in rhomboidal dodecaëdrons and its modifications, for which see *tabs.* 43, 44, 120 and 364. They, however, occur in some variety, as to the perfection with which they crystallize; their brilliancy, and additional number of facets. Like the former, they are sometimes detached from the rock, or easily separated. The best seem to be most usually in the least decomposed Granites. *The upper figure* is an irregular fragment of micaceous Granite, of which the reddish part is Feldspar; the whiter part, Quartz; and the whitest, Mica. The Garnets are of a good colour, and have a tolerably natural polish: some are rather compressed, and some have a face or four-sided truncation upon the apex of the four-sided pyramid. *The lower middle figure* is representative of those in the gangue above. *The left hand lower figure* is a larger and nearly regular one, of a dull roughish aspect, found detached, or rather having fallen out of a somewhat sandy rock. The other, which is larger, showing the truncation, was sent me detached, with some other favours from Scotland, by the Rev. James Dalton, and the former ones are from the neighbourhood of Aberdeen.

Garnets vary much in size. I have one, with which I was favoured by Lady Wilson, from Scotland, above an inch in diameter, and they are sometimes larger; perhaps they may be found equal to those from Fahlun in Sweden, which I have seen very large; and I have one, a rhomboidal dodecaëdron, nearly five inches in diameter.

These specimens, with their gangues, will be doubly useful when we come to treat of the Rocks.



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TAB. CCCLXXIV.

FERRUM sulphureum.

Curving or Bending Pyrites.

Div. 2. Imitative.

Perhaps I could not show any thing more extraordinary or, I believe, more rare in the system of Crystallization, than the present specimen which I possess by favour of my good friend Philip Rashleigh, Esq., of Menabilly, who sent it to me in 1806, labelled from Carundale in Devonshire.

Pyrites is well known to form the Cube and Octaëdron, with their modifications, very neatly: see *tabs.* 29, 30, 99, &c., and to produce varieties from them, wedge-formed, rounding, concave, and convex, cock's-comb-like, &c.; see *tabs.* 366 and 367; and to mix in somewhat cruciform and other odd appearances. In the present instance the Pyrites seems more like Sheet Metal cut into pieces, as if with a pair of sheers, curving in various directions: thus we have an appellation of "imitative" to recognise it by; which is very convenient in the present instance. I do not know that curved crystallization has been at all mentioned by any author. I should suppose, however, that it depends upon the same laws of aggregation in this substance as the straight or rounded; see vol. ii. p. 57: and the rounded figure in *tab.* 131. Its state while depositing from the solvent, and the solvent, may account for immense variety. This, however, is a very rare example, identifying a new kind of form, and bespeaking another source of boundless variety. The crystals seem to be formed of plates belonging to the cube and cubo-octaëdron, passing in a more or less continued line of elongation, forming a sort of wall-like appearance in various directions, and may perhaps be compared to a tall weak wall on an irregular foundation, bending before it was hardened by drying. The crystallization of Pearl-spar, *tab.* 19, *lower figure*, which curves, seems governed by a different law: the molecules seem to slip while depositing; and the Sulphate of Lime, *tab.* 68, seems to bend from an elastic property.

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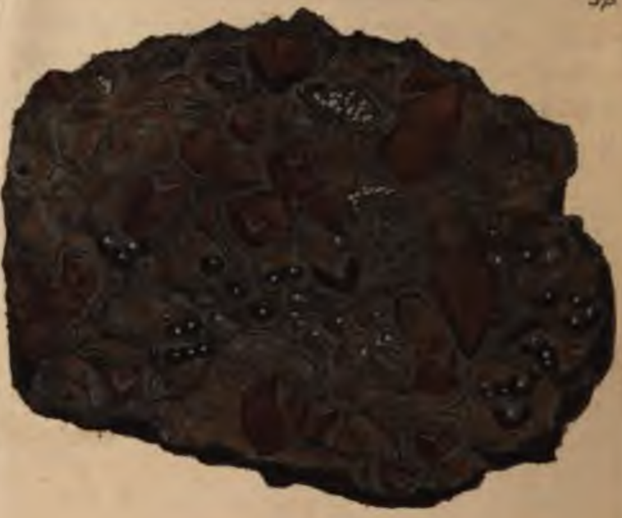

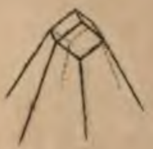

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TAB. CCCLXXV.

FERRUM oxygenizatum.

Oxide of Iron.

Class 3.	Metals.	*Order* 1.	Homogeneous.
Gen.	Iron.	*Spec.* 3.	Oxide.

Div. 2. Imitative.

THE present is not only a new but an instructive specimen. The crystals are secondary, but so perfectly distinct to every observer, that their derivation is truly evident. The grand vicissitudes and changes continually going on, even out of our sight, become in this instance very evident:—were the operations carrying on in our sight, we could not be more certain of them. Hæmatitic Iron, see *tab.* 56, is shown in this specimen, forming the concentric radii, in coats one over another, having lain over metastatic crystals of Carbonate of Lime; which being decayed, their place was filled up by a fresh supply of Oxide of Iron, with such exactness that the least attention to crystallization discovers the process. The moulding or coating in this manner is so sharp and accurate, that it may lead to a means of improving in such arts, especially as it is evidently a wet process, although it possesses so much the resemblance of fusion, as to have been actually thought so by some; but we herein see how the two processes resemble each other when completed.

Three different states of Oxide of Iron are visible in this; viz. the black-brown, the red, and the Roman Ochre; and I conceive an indefinite number of Oxides may be formed by the blending of these: nor do I think Iron is capable of taking oxygen from water, &c., in these different degrees which colour seems to represent; but when blueish or purplish, or any variety exists, it may depend upon Carbonic Acid, Hydrogen, Phosphorus, Manganese, &c., which may be known by their external appearance.

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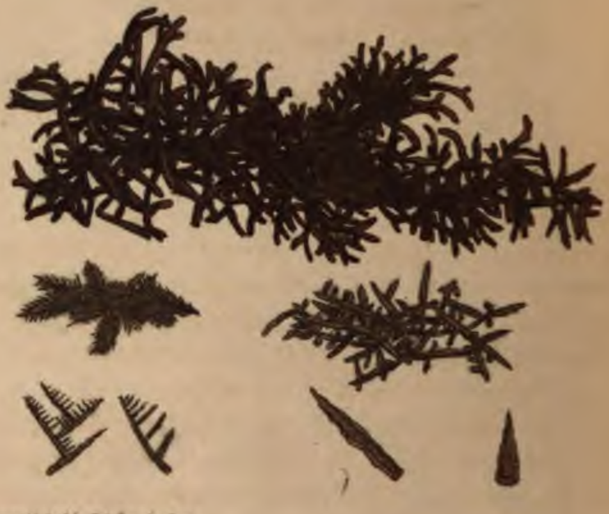

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TAB. CCCLXXVI.

CUPRUM nativum.

Native Copper.

Class 3. Metals. *Order* 1. Homogeneous.
Gen. Copper. *Spec.* 1. Native.
Div. 2. Imitative (wire-like.)

PERHAPS this formation would never have been expected in Native Copper by the tyro in Mineralogy; and it is indeed very scarce. The rounding branches irregularly disposed, inosculating with their bluntish terminations and rugged rusty appearances, might be taken at first sight for a number of pieces of Iron wire aggregating so confusedly by means of rust: however, in colour it approaches to Copper, and may by scraping be easily distinguished, having the softness and red metallic lustre. It is rather remarkable, that the branches, if I may so call them, are sometimes so much coalesced as to join apparently in a continuous manner; at others they seem attached, as if pressed one against another and stuck together; and some parts of the sides and ends terminate as if they once had been joined to others, some being blunt and roundish, and others having a small concave disk.

I have placed another branched specimen, having the branches six-sided and somewhat irregularly cut, resembling an endeavour to do it with a knife, and so are somewhat scalloped, partly concave and generally rather flattish, with two sides broader than the rest; see *the right hand magnified figure* at the bottom.

I have placed another peculiar ramification at the bottom on *the left hand*, showing more of the nature of structure depending on the order of the crystallization, more or less zigzag or feathered, which is shown more distinctly in the magnified figure. The whole are very small, but indicate the rhomb, *tab.* 216, and the dodecaëdron, *tab.* 25, which are almost recognisable: the rhombic accumulation is pretty evident, and the angles of the zigzag appearance are the corners of the rhombs. Moss Copper generally belongs to this variety.

The specimens are from Cornwall, but the upper one is the most rare: such are much valued.

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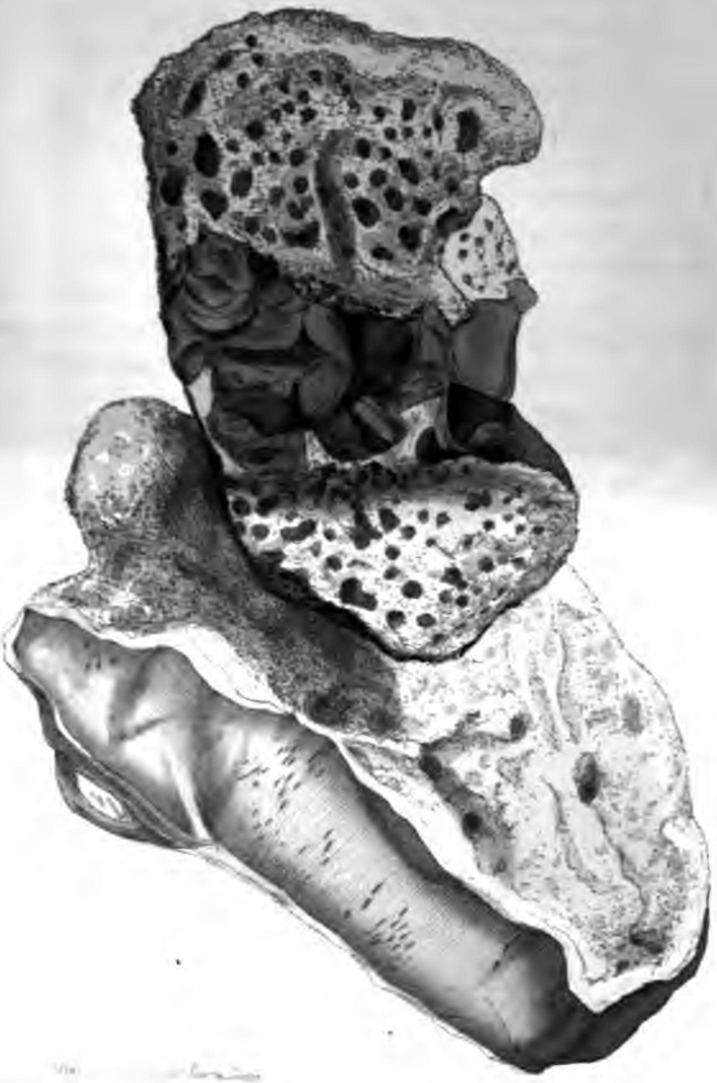

TAB. CCCLXXVII.

SILEX quartzum, *var.* opalinum.

Opal.

I HAVE given (*Brit. Min.* 111) a figure and description of the Precious Opal of Cornwall. I now show a variety from Sandy Bræ, brought from thence by Humphry Davy, Esq. of high chemical celebrity. Opals have been divided with some difficulty into several kinds; as The Precious Opal, The Common Opal, Semi- or Halb-Opal, and Wood Opal. The good and bad might have been sufficient distinctions, as the several kinds run into each other. The three first arrange according to their goodness; the Precious Opal having a pearly brilliancy with a fine soft display of most of the prismatic colours, and a brilliant lustre peculiar to itself: the Common Opal has less of this lustre; and the Halb-Opal borders on it so feebly as to be considered as only partly an Opal: the Wood Opal may have all these varieties, but is infiltrated into the remains of wood retaining its structure. These distinctions therefore do not all belong to the substance, and become incorrect, or mislead. The present specimens are remarkable: *the upper one,* for a fine somewhat resinous appearance, from a light dull greenish yellow to a resin brown, with a fiery or orange yellow sparkling splendency reflected as the light passes among the flaws.

The upper specimen is in a sort of decomposing Porphyry, spotted and veined with resin-like Opal mostly dull in colour.

The lower figure has something of the appearance of light

y Pitch, and is such as is often found in the ligni-
ite. I have an example in a foreign specimen
with Pitch-stone.

are chiefly Silex with from 5 to 10 per cent. of Water,
der certain circumstances, are so operated upon,
isture and change of temperature more or less sudden seem to cause the various appearances; and those that become degraded below the Precious, are less and less pure with various adulterations. Generally found in more or less perfect Porphyry.

Analysis of the Opals:

	Precious Opal.	Common Opal.	Semi-Opal.
Silica - -	90· - -	93·50 -	- 43·50
Oxide of Iron	— - -	1·00 -	- 47·00
Water - -	10· - -	5·00 -	- 7·50
Loss - -	— - -	50 -	- 2·00
	100·	100·00	100·00

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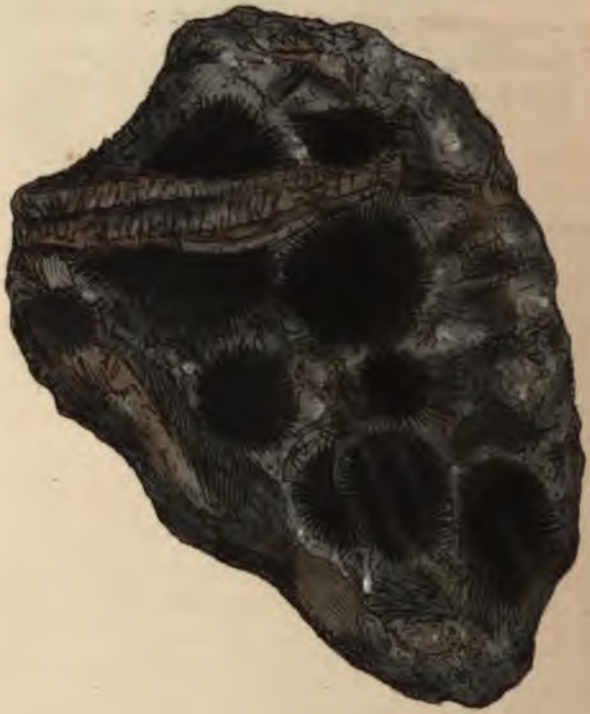

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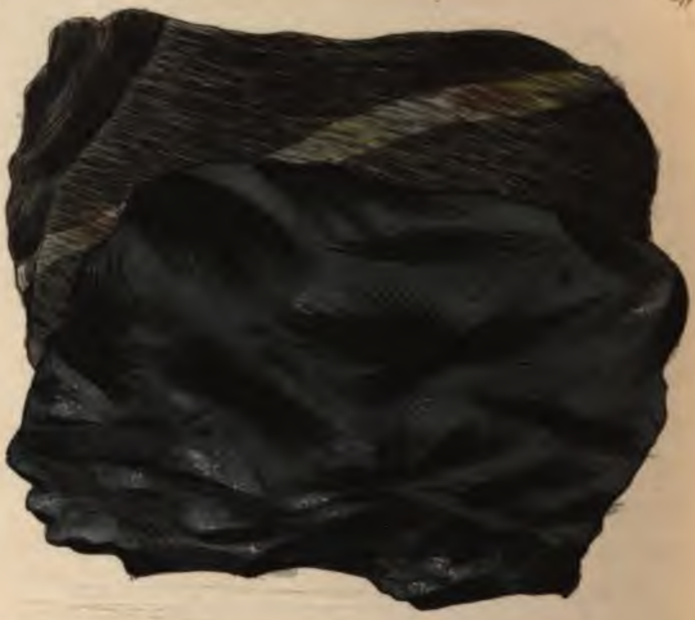
TAB. CCCLXXVIII.

ARGILLA electrica.

Stellated Tourmaline.

THE different appearances that various substances assume is the greatest stumbling-block in Mineralogy: it becomes therefore necessary to learn them; and although forms under the same terms may belong to various substances, they are nevertheless often characteristic of particular species. The present variety, although not common, is pretty well known among the Cornish miners, who call it Cockle, which is generally recognised as Schorl or Tourmaline by mineralogists. See *tab.* 209 and 210. We may find specimens that lead from the more crystallized form of those of the filamentose structure through a great variety of arrangement to the present stellated one, where the crystals shoot as it were from a centre, are thin, and interrupted in their forms by pressing among each other; so that externally we guess at them from a similarity in appearance to those of a more conspicuous size, generally angular, and mostly shining and longitudinally striated on all sides. If experience does not determine them to our satisfaction in this, we must proceed to hardness, electricity, &c., to find their correspondence.

Our specimen is rather remarkable, being in a gangue chiefly composed of Mica. I have a specimen from Aberdeen nearly like it; but the Schorl is chiefly imbedded in Quartz, and a mass of Mica attached to the specimen has only a few scattered bits in it.



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TAB. CCCLXXIX.

SILEX fragilis.

Brush-like Actinolite.

THIS curious and remarkable variety is not uncommon in some parts of Scotland, and further north. Its laminated structure and softness will pretty readily distinguish it from Schorl, which it has been taken for. *The upper figure* represents the opposite side of a piece not much unlike *the lower specimen,* and is composed almost wholly of Actinolite lying in confusedly parallel order, with an oblique whitish streak looking like a vein: the rest is mingled with dull and darkish greens: one end shows its scopiform appearance: on the other side it is more crowded than in *the specimen below,* which is more schistose, composed of light gray fine silvery Mica, relieving the curved brush-like lines, formed by the somewhat twisted bundles of actinolite, which are rather dull greenish black on the surface, but shining on the sides, and nearly resemble the end fracture of *the upper specimen.* I received this and some other interesting specimens from the north of Scotland, by favour of my good friend James Brodie, Esq. formerly mentioned in this work. It was gathered by the Rev. Patrick Forbes of Boharm in Scotland.

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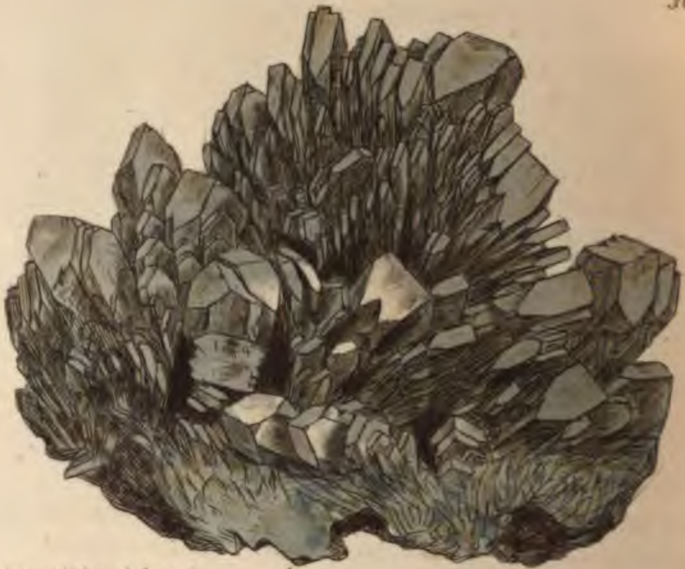

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TAB. CCCLXXX.

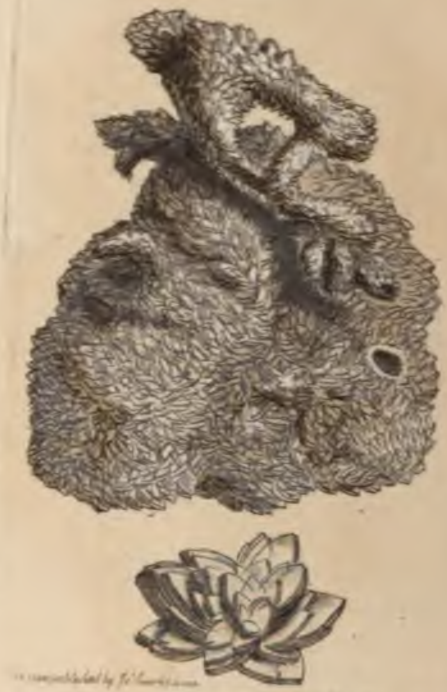
BARYTES sulphata.

Sulphate of Barytes.

Div. 1. Crystallized.

THIS figure leads from nearly the primitive thickish rhomboidal prism to the flatter plated crystals, which are piled by the side of each other upon one of their most acute edges, (*see tab.* 70,) consequently giving it a very different appearance from the right-angled plates more usually seen, as in *tab.* 72, the edges of which are parallel to the diagonals. The crystals upon this specimen are mostly truncated upon the acute solid angles, the truncations forming little triangular facets; and they are all so deeply truncated at the obtuse solid angles, that the truncations meet. *Tab.* 70, *bottom figure*, shows one of these faces; and *Tab.* 95 exhibits both.

This specimen came from Dufton. It is convenient here, as it partly leads to those flatted primitive forms that stand on the acute edges and are often very thin, without any decrement on the angles, but occasionally passing by minute degrees towards an elliptical form, produced as it were by being placed by the side of each other when forming, but slipping or falling a little out of the parallel with those above or below. This sometimes seems the cause of the curved-like appearance which happens in Sulphate of Barytes like that of Pearl-spar, *tab.* 19; more particularly when the latter is a flatter variety. The weight and pearly lustre will, however, most generally distinguish them. The next figure partakes of this appearance.



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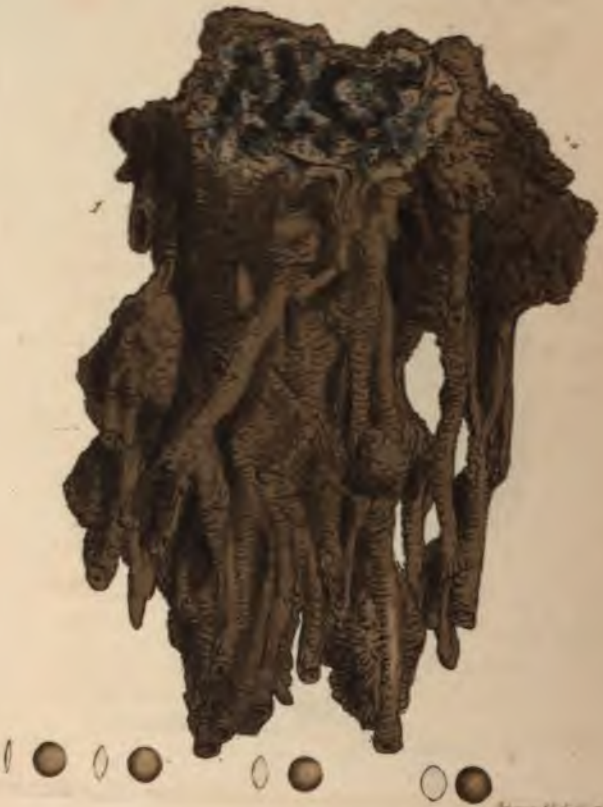

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TAB. CCCLXXXI.

BARYTES sulphata.

Sulphate of Barytes.

Div. 2. Imitative, Stalactitical.

These crystals of Sulphate of Barytes are placed upon their acute edges; they are for the most part extremely flat, so that the column is as it were lost in flatness, and the form is in some parts less easily understood, as they are crowded very much, and strangely grouped into hanging and curving forms, and each individual crystal is a little rounded. The present specimen is, I believe, as rare as it is curious, as we could less expect a heavy substance like this to have such an appearance among the groups. Some have an apt resemblance to a parcel of petals, giving the appearance of a corolla or flower. *See the lower figure.*

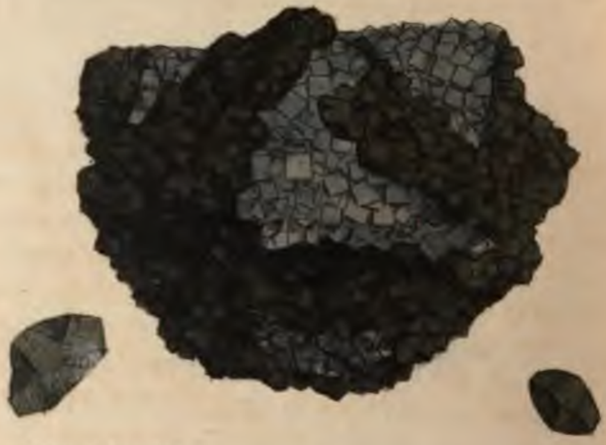
We need not wonder perhaps at any general appearance of this substance, when we see how it sports here; yet it is necessary to know that it has many odd appearances which might be attributed to something else.

TAB. CCCLXXXII.

Stalactitical Sulphate of Barytes, as far as we know, has not been observed by any author. I have therefore introduced it as one of the curiosities that was in Mr. Day's collection. It is from Matlock in Derbyshire. It shows a curious state of aggregation, crystallizing after solution, running and dropping in very elegant and varied forms.

The crystals sometimes line the tubes and nearly fill them in a concentric manner like the common calcareous stalactites: the tubes are often nearly empty. The outsides of the tubes are covered with somewhat globular aggregations of sharp lenticular crystals, some of which have very much the appearance of globular crystals.

383.



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TAB. CCCLXXXIII.

FERRUM sulphureum.

Sulphuret of Iron—Iron Pyrites.

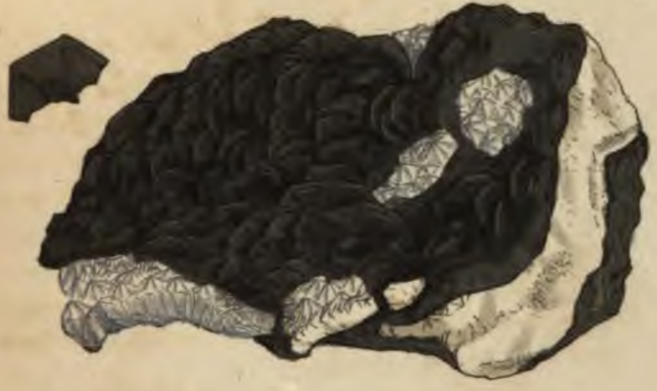
Div. 1. Crystallized.

Plates 366 and 367 are curious examples of the crystallization of this substance. The present extraordinary specimen seems to elucidate somewhat of the origin of those modifications from the cube. *See the right hand lower figure.* Two of the horizontal edges at each end of the cube are replaced by rounding faces of such extent that they meet each other in a line, towards which the vertical faces are enlarged at the same time that they become concave (*see the right hand figure*): three of these crystals are grouped together to form *the left hand figure,* thus disguising the cubic structure. These and various other intermediate forms, depending upon such a process, are on the specimen, that is to say, one independent crystal, another notched, or one joined as it were by one of its concave sides to another or two others, not more, with the mutual loss to each of a concave face, forming a straight seam, while the other sides are more or less concave or straight, same as represented in *the figure,* with the striæ of aggregation on the upper part, as I shall call it for distinction sake; the whole appearing as if formed from a centre into three wedges. The crystals on this specimen are remarkable for their thickness, which much facilitates the study of them: as they become thinner, they generally group in greater numbers and with less regularity, thus forming the Cock'scomb Pyrites above referred to in *tab.* 366. The crystals are much elongated, and some of them are joined by their convex faces, forming deeply furrowed groups, not notched plates.

The gangue of this specimen is octaëdral Galæna coated by Cubic Fluor.

TAB. CCCLXXXIV.

THIS is a modification depending on the same laws of aggregation as the last; but the notches are filled up by a continuation of the striated faces: the crystals are much compressed, and often very thin, having the appearance of hexangular plates, three sides of which stick deep in the gangue: they however terminate more or less solid in two or three angles only, against each other, or in the more massy part of the Pyrites. This Pyrites alternates two or three times with the Quartz.



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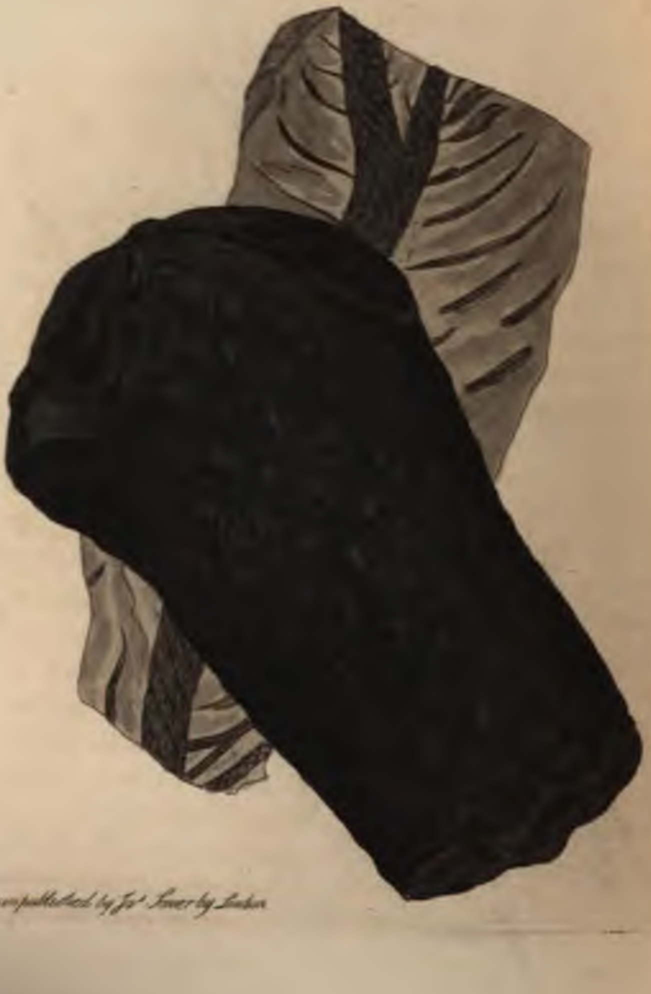

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TAB. CCCLXXXV.

CARBO bituminosus.

Plant-formed Coal.

Div. 2. Imitative.

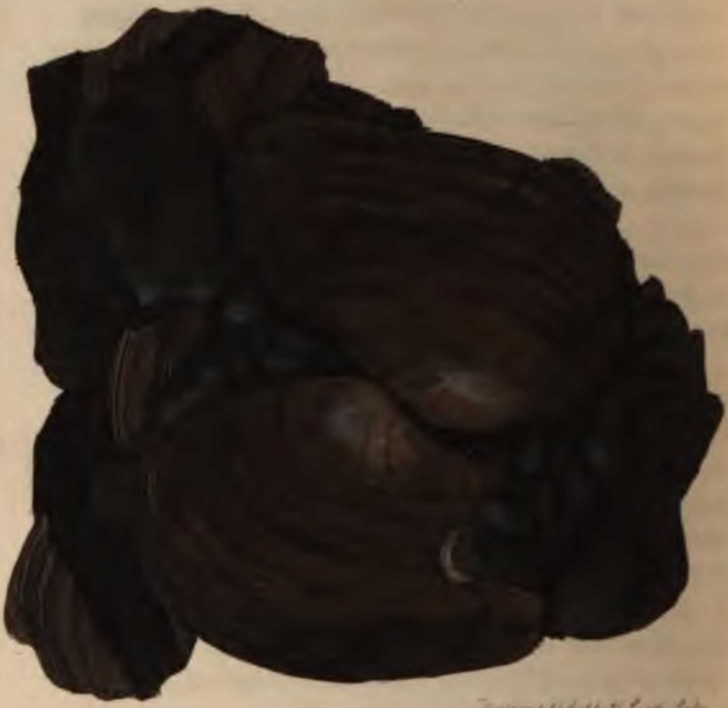
No subject in Mineralogy is more deserving of the attention of mankind, or is perhaps more instructive, than the formation of Coals; whether it bespeaks the contrivance of a flood as necessary for their formation, or proves that they are in the great bulk, at least as far as we are allowed to penetrate, dependent on principles passing through organization. Nor is it the less curious, that while we have appeared so long ignorant as to the nature of the subject thus returning to an inorganized state, yet every day some fresh assistance meets our inquiries, as we are allowed to improve them by an industrious research. The present specimens are proofs of the eminent beauties constantly observable in the variations of Nature; and while they show an analogy to our modern system, yet present us with Genera and Species so foreign, that we are at a loss for comparison. *The front specimen* is the cast of a stem of some plant which is covered with a very regular arrangement of squamæ, such as remain occasionally after the old leaves are fallen off as the smaller branches advance. The squamæ are very perfect in appearance, and are arranged in spiral order; in some specimens the spire winds to the right, and in others to the left: those on the right hand side of the specimen figured have an embossed centre, and an apex somewhat thickened, and approaching the obtuse triangular scar that the leaves of many plants leave after falling off, with the decurrent swelling below. The nearest approach to this regular lozenge formation is in the small branches of some species of pines, Euphorbiæ or Proteæ. From the larger flatted impressions and the smaller branched ones, it should appear that this was not a very small species of plant. I have a flattened impression that is seven inches wide, and this specimen is smaller than some others which I have, but was chosen for its having the divided end, showing that the plant branched, besides the sign of the two pith-like round holes, one for each branch, remarkable for being on one side in these, as well as in those not branching. The hollow is generally longitudinally striated.

The other specimen shows a smaller branch, with some remains of leaves which are a little carinated, acute, in length about twelve or sixteen times their breadth, and swelling a little from their base.

These specimens are both Ironstone, upon which the coaly remains of the plants are impressed. In *the front specimen*, the Coal has the usual fracture, and is about the tenth of an inch thick where the squamæ are most distinct, as one side has only little regular embossments, the squamæ being obliterated by scaling off or wearing; or perhaps they were never so perfectly formed, on account of their being in a position less fitted to preserve them: this ought to be noticed, lest in some instances it should lead to mistake in the species.

Other species of similar construction are found at Lord Middleton's, Woollarton, near Nottingham. I have, among other remarkable ones, some much branched, by favour of Thomas Meade, Esq., from Poulton in Somersetshire.

316.



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TAB. CCCLXXXVI.

CARBO bituminosus.

Bituminous Coal, containing Animal Remains.

Div. 3. Amorphous.

Coal is now much more universally understood to originate from the vegetable decomposition than when I commenced this work, and my figures in *tabs.* 187, 188, 189, 385, &c., appear to place it out of doubt. It however does not exclude the probability of animals at the same time depositing their proportion of Hydrogen and Carbon in similar circumstances of decomposition, under pressure, and caught when more or less in full life and perfection, and fittest to form the more perfect Coal. Animal remains, however, like the vegetable, can in this instance be detected only by the stronger parts that appertain to either: the latter by impressions, casts, &c. in the more earthy substance that enveloped them while their juices were infiltrating by means of moisture and their own more volatile parts. The former is somewhat more rarely detected in the coal formation; the actual remains of the more earthy parts, however, attending their structure forming moulds, &c. Thus analogy teaches us that the more volatile parts, like those of the plants, are infiltrated into the Coal.

The present specimen, having the shells actually among the Coal, is so presumptive a proof of this, that we have no hesitation in considering it as a confirmation; and as we do not often find the actual remains in the Coal formation, we conceive it very proper to give a figure, especially as the shells are in such perfection as to be known outwardly nearly as well as if they were recent. As far as I could detach the coaly matter, &c. from the inside of one, it seemed to have no more hinge than Mytilus cygneus of Linnæus, which it greatly resembles, but it is a thicker shell: it does not strictly accord with any modern one that I know, I shall therefore call it Mytilus crassus. The shells are composed of crystallized Carbonate of Lime, in some parts rather transparent. The specimen has other Carbonate of Lime in the crossings and small partings, with some argillaceous Oxide of Iron. The coaly part is mostly bituminous, and has the fractures corresponding with it. It appears to be found in large compressed layers, with innumerable quantities of shells of this sort only. They were called petrified Oysters by the miners, who found them in a stratum above the Cannel Coal near Wigan.

I at present know of no others so absolutely in Coal. The usual Ironstone that accompanies Coal has many species of shells, which however seem to accord with the Mya of Linnæus.

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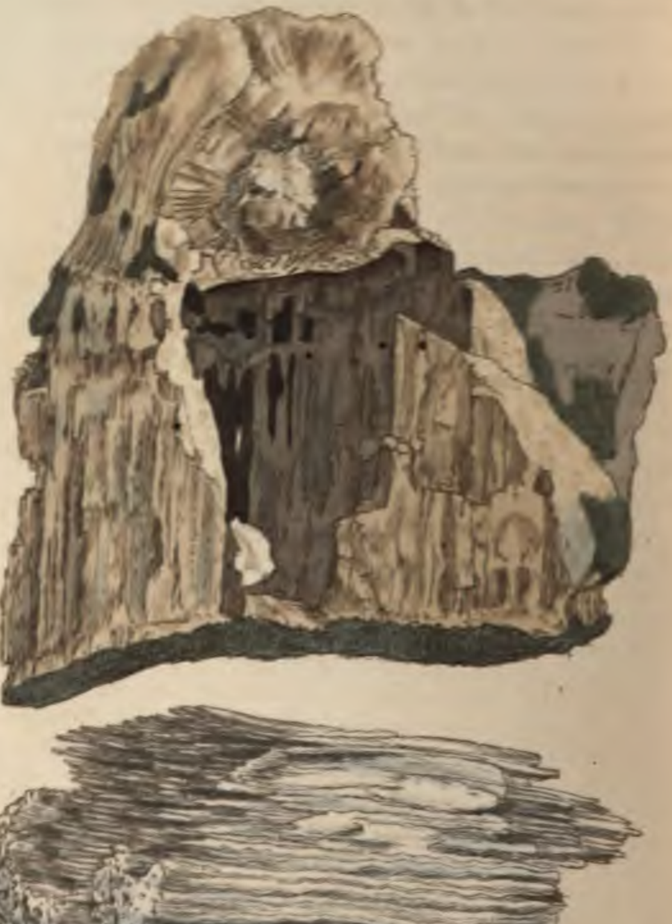

[illegible] by J.s Sowerby London

TAB. CCCLXXXVII.

SILEX quartzum, *var.* fibrosum.

Fibrous Quartz.

Div. 2. Imitative.

Sir Joseph Banks* the discoverer, and many others who have been surprised at the regular pediment and architecture formed at Fingall's Cave, now so well known, would again be surprised, were they to see the present specimen of the same dimensions. As a representation on paper, however, only gives a diminished figure, this, in that respect, only wants the idea of largeness to be annexed to it to equal that in grandeur.

Here we see what may in common be termed coarsely fibrous Quartz, the fibres lying in a vein in a Schistose Rock stretched more or less regularly from one side to the other, connecting the two by these filaments; a very curious circumstance, and little noticed before this in any Mineralogical work.

Besides the instructive point in which *the upper specimen* may be viewed, the picturesque structure which represents a ruined Temple also points out a new and most natural order for Architecture. The upper part represents a rude and heightened pediment, with a sketch of radii placed behind a bust, which is roughly but elegantly sculptured, as if for a sign to point out to whom the building was dedicated. The cornice is in a somewhat stalactitical form, giving much effect by projecting forward so as to show the stalactites partly in the shade beneath, which, in tolerable order, hang lower and lower till a less projecting cornice is as it were formed, with various openings, ornamenting the space between like Attic windows elegantly contrived of oval and other forms. Beneath this cornice are the main columns in varied proportions, arranged so as to admit light to the interior, and finishing by gradually swelling into a sort of base on the lower cornice and on some of the columns, giving a good hint for order. There are some bright octaëdral crystals of Pyrites, pointing out judicious places for lamps.

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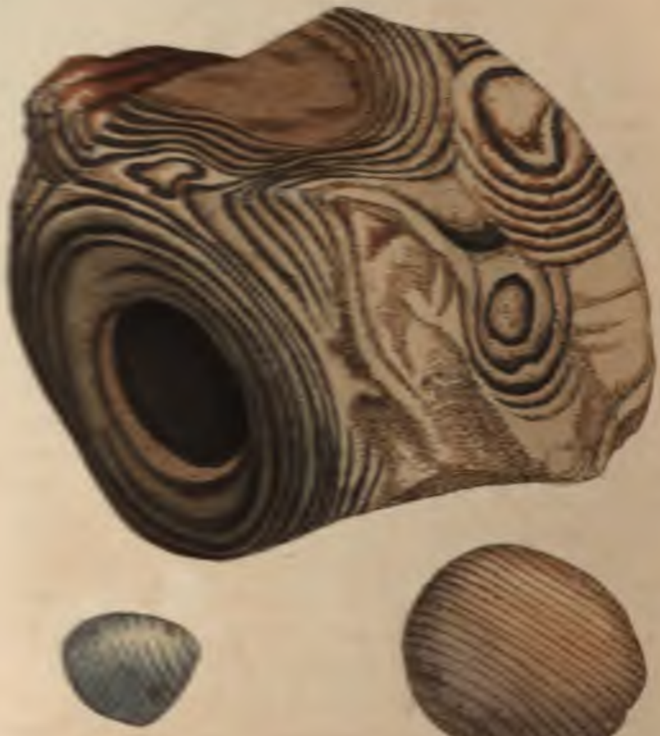
* Who first made known the description of Fingall's Cave, and furnished Pennant with the account.

318.



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TAB. CCCLXXXVIII.

SILEX quartzum.

Striped Flints.

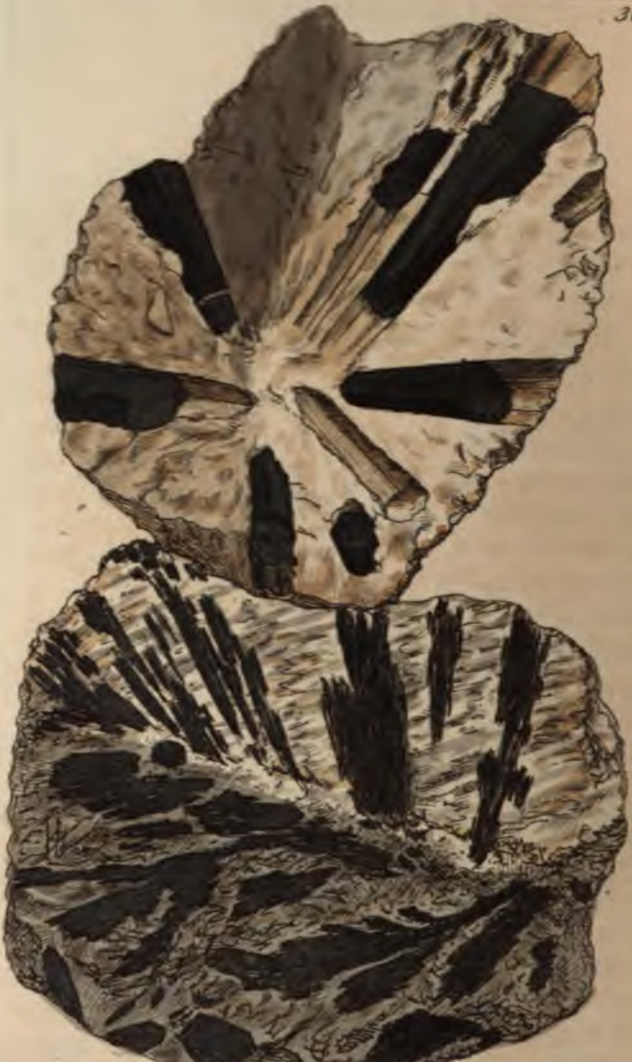
Div. 3. Amorphous.

SCOTCH Pebbles and Agates are most commonly known in beautiful variety of concentric circles or laminæ, and have been in high estimation in jewellery, and still continue so. *See tab.* 160. Striped Flints are less known; although not very uncommon, yet more rare than the above, especially when the stripes are in circles, or concentric; and they are only valuable for information, and have in general less variety of colours and probably of substance.

The upper specimen is from King's Weston, near Bristol, and consists of more or less condensed Flint; the denser parts are the darkest, and the lighter more or less porous, and occasionally coloured of an ochraceous hue. The present specimen is remarkable for having a hollow centre, and the circles being so extensive that when broken externally it of course appears as if there were many circles and centres. Flints of this nature and of a larger size are found at Woodford in Essex.

The lower specimens are such as are found in the Gravel near the Chalk Pits at Charlton, Plumsted, &c. These are sometimes apparently parts of the larger sort, and are more or less rounded by attrition, consequently showing a later time than that of their formation for being deposited in their present situation.

The stripes in these instances seem to depend upon a deposition of the parts while supported by Marle or Clayey Rocks, and not upon laminæ falling like strata, one part imposed upon the other:—the lower pebbles were thought to be of the latter construction.



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TAB. CCCLXXXIX.

SILEX electricus.

Pointed Schorle.

Among the many forms that this substance assumes, and not rarely, is the present; but it has not yet been described, to my knowledge. It is composed of elongated prisms, a smaller or greater number of which commencing at a point, often diverge to great lengths, thickening more or less regularly, as figured. I have them mostly six-sided, with some of the angles here and there truncated longitudinally, so that some have as many as twelve sides, giving the appearance of a peg cut in angles and left without being rounded. I expect they are often of great length: what I have are only about three inches long (sent me by the Rev. Patrick Forbes lately mentioned), but these have no terminations. They sometimes, however, end abruptly, as the hollow impressions show: they sometimes also have a transverse crack, which is filled up with Quartz. Indeed it does not appear to me that any one has yet made a research for the purpose of investigating to what length Schorle may shoot or lengthen: perhaps this may be a hint towards some attempt of the kind; which, however, is the more difficult as it is so frequently among Quartz in the hard Granite Rocks: when, however, it is found among the more micaceous parts of it in veins, it may be better traced, as in such situations it is often very long, but perhaps seldom so perfect.

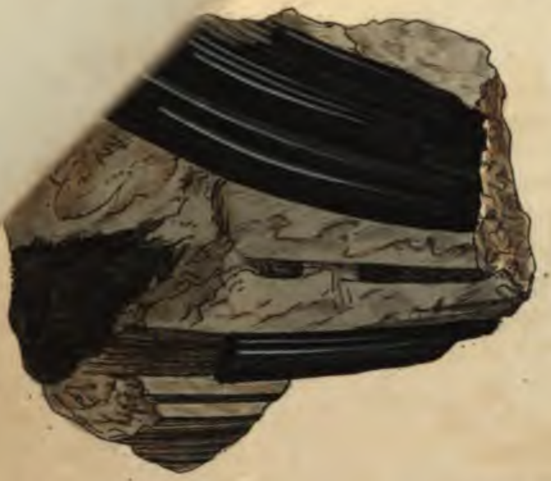
I was favoured with *the upper specimen* by the Earl of Seaforth, from the neighbourhood of Portsoy in Banffshire. In it the Schorle is passing through or among Felspar or Kaolin and Quartz, leaving its impression where it has become detached, which is often the case, as in some parts it

LXXXIX.

XC.

Rock, well known i
within a few yards of
vein of Quartz. It ran
ut owing to my want of tim
ain how far. This specimen
and finely polished, which app
e be called the Tourmaline varie
enish hue when viewed so as to trans
more or less covered with the prismatic i

390



Dec. 1 [illegible] Published by Jas Sowerby London is almost loose, with Mica interposing between it and the Quartz. I add *the lower specimen* as a remarkable variety among shattered Quartz, diverging and divaricating in fasciculated prisms almost approaching to spiculæ; the principal Quartz fracture being on one side or at right angles with them or nearly so, as if formed in another direction. This is from Aberdeen.

TAB. CCCXC.

WHEN I was at the Logan Rock, well known in Cornwall, I gathered this specimen within a few yards of it out of a very large solid massy vein of Quartz. It ran some length into the Quartz, but owing to my want of time and tools I could not ascertain how far. This specimen is of a close hard texture, and finely polished, which approaches what may by some be called the Tourmaline variety; it has a slight greenish hue when viewed so as to transmit the light, and is more or less covered with the prismatic iridescence.

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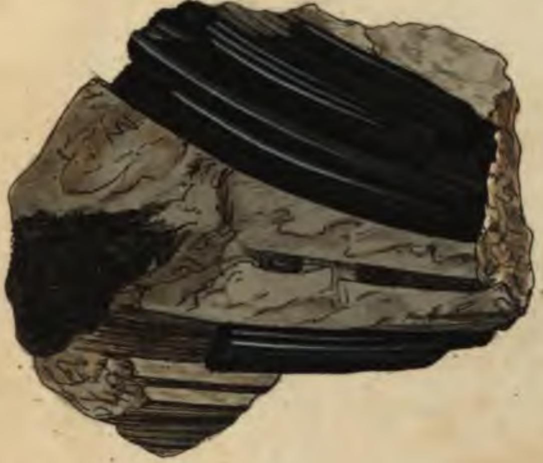

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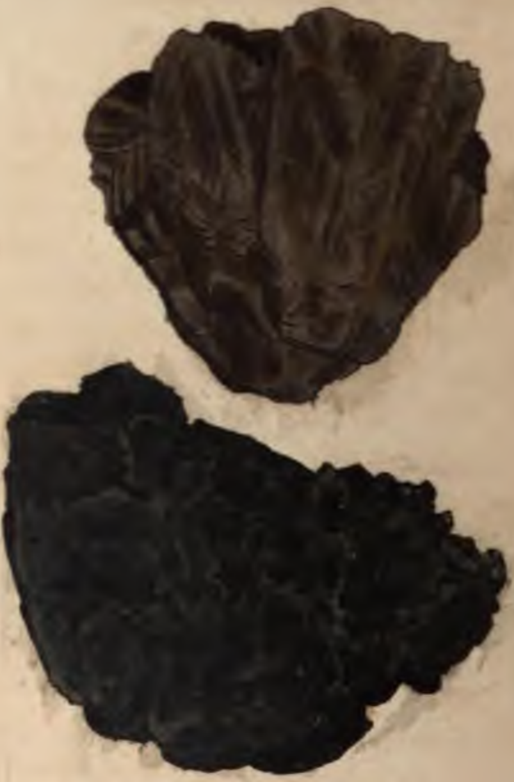

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TAB. CCCXCI.

SILEX Mica.

Brown and Black Mica.

THIS substance may be found of almost all colours, except blue; at least there have not yet been observed any specimens of that colour. *The darkish brown variety,* figured at the upper part of the plate, is not uncommon in small specks or specimens in Granite, but rather more rare of a larger size: the group is not as usual convenient for dividing into plates, but is seemingly a congeries of scaly crystals arranging in a peculiar angular manner, sometimes according with the angles of the primitive rhomb, meeting and mingling so as to become quite zigzag, while the accumulated planes are diverging from different centres in confused order. Its colour gives it rather the appearance of thin horn, but it has a more glassy lustre.

The lower specimen is rather rare, being of a true shining black, *i. e.* black without any mixture of brownish, blueish, or any other colour: it has a more glassy lustre than *the upper specimen.* The congeries of plates on one side of the specimen are small and on the other larger, more continuous, partly undulated, and altogether less orderly, and not regularly enough grouped to need particularizing.

Common brown Mica of the shops is often two feet or more square, and when used very thin for microscopes appears nearly colourless.

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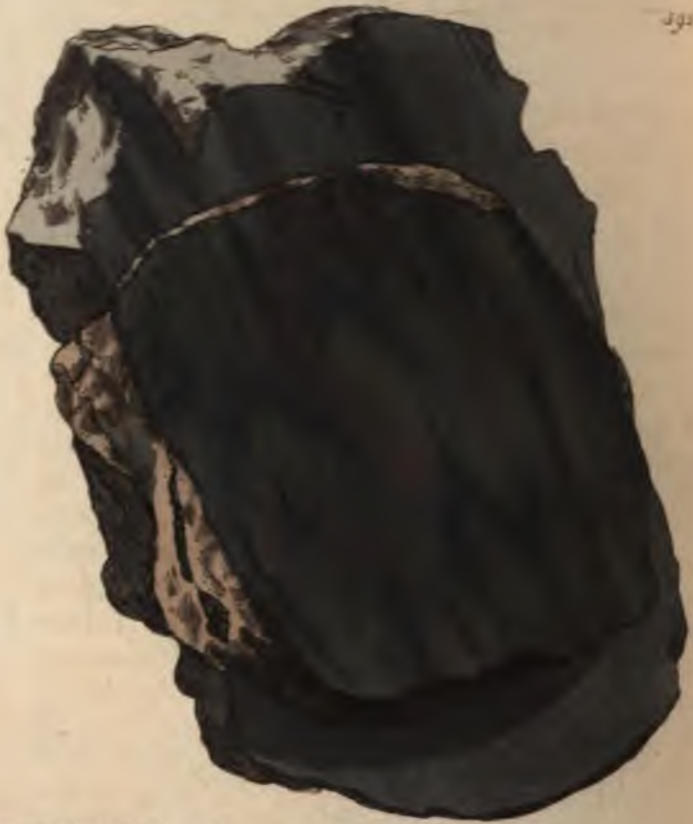

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TAB. CCCXCII.

PLUMBUM sulphureum.

Slickensides Galæna.

Div. 2. Imitative.

Syn. Spicular compact Lead Glance. *Jameson* 2. 355.
Compact Galæna. *Kirw.* 2. 218.
Slickensides. *Bab.* 170.
Plomb sulfuré compacte. *Haüy* 3. 461.

This variety of Galæna, rare in any country but England, is found chiefly at Castleton in Derbyshire, and I have some specimens marked Ecton Mine, which is partly in Staffordshire. It appears to be the common Galæna, but, by a certain slip of two faces as it were of a separated mass of rock, is pressed into a finely granulated compact appearance, quite losing the regular cubic fracture, otherwise usual to Galæna, and which so essentially distinguishes it from most other substances. Sometimes this is rather massy in the interior part of the specimen, near or quite adjacent to the polished face, caused probably by the broken ends of strata slipping and pressing against each other. It may be on the face of mixed rocks, on Fluor, Quartz, and Sulphate of Barytes. It is said to be dangerous sport to the miners when they meet with it unexpectedly, as it is easily detached with a sudden explosion, and is thrown with such considerable force that it has even been fatal to those that are within its range of action; but when, as by experience, they have learnt to discover, by the sounding of their tools against the spot, that the next stroke may detach the slickensides, they stand beneath, if the situation allows, and, advising their friends to arrange themselves in safety, spring the mine as it were in triumph. I presume that the compressed air, allowed relief from a space so broad and suddenly coming into contact with the common air, causes the noise, and the expansion impels the stones to a proportionate distance, and fragments fly afar over the operator's head, who has a reasonable cause to triumph, as his knowledge has taught him to make sport with safety where he might have suffered by ignorance.

The specimen figured in the front of the plate is from Ecton Mine, where so many brilliant coloured and variegated specimens of Pyrites occur; and this is not a common variety, because it partakes of the splendid prismatic colours added to the highly polished surface. The piece figured behind is more usual, and at first sight very much resembles the Free-stone of a chimney when shining with common Black Lead or Plumbago, which sometimes by means of smoke has the iridescent or prismatic colours, but in this it does not resemble it. This specimen has Mineral Pitch and Pyrites about it in veins.

Other substances are liable to be polished in the same

TAB. CCCXCIII.

SILEX quartzum, stellatum.
Radiating or *Stellated Quartz.*

Div. 2. Imitative.

This has long been esteemed as curious, and is perhaps nearly as remarkable as the Corsican Granite*; which, although differing somewhat in the contents, nevertheless leads towards a similar construction, and may be as difficult to account for. This specimen also much resembles the Carbonate of Lime, represented at *tab.* 144. It is yet the more extraordinary, as it is a large separated almost insulated stone lying on the surface of a field at Scorrier-House, belonging to our kind friend Mr. Williams, where it is only known, and to whose friendship I am indebted for the specimen showing the crimson, amethystine or pinkish Quartz. With the other specimen I was favoured by Phil. Rashleigh, esq.—It is somewhat imitative of some of the Hæmatitic Iron Ores, which have many centres, and radii of different lengths. *See tab.* 133.

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* Which will be figured ere long in Exotic Mineralogy.

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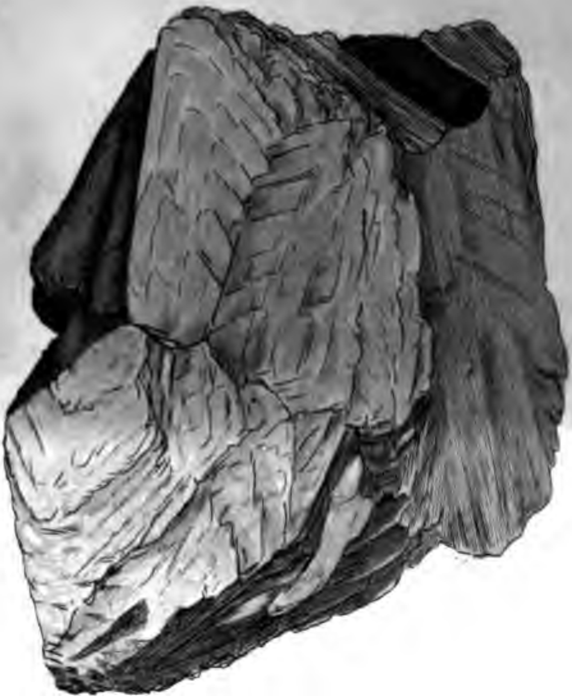

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TAB. CCCXCIV.

SILEX Mica.

Silvery Mica.

In the description of *tab.* 80, we noticed the difficulty of imitating the lustre of this substance; but having found means of partly surmounting that difficulty, we are happy to produce examples in the present figure. This one is a curious aggregation of laminated crystals, if I may so call them. It is also very remarkable for being one of the first examples of Mica showing an inclination to mackle. In the present instance the plates are chiefly aggregates of smaller rhomboidal ones; the mackle forms by the sides of the rhombs being contrary to each other, like some of the Gypsums. *See the lower figure of tab.* 223, which seems to depend upon similar laws of crystallization.

This is sometimes found in very large masses. I have specimens six inches long from Aberdeen.—Schorle is occasionally included in it.

I have lenticular crystals of this substance in an ordinary specimen, which, as they certainly are but little if at all noticed, I mention here. They are seemingly formed of the laminæ placed a little irregularly edgewise, resembling the lenticular Sulphate of Barytes and some specimens of Talc, which latter is however generally smaller, *see tab.* 182, where they nearly approach this figure, or rather in *tab.* 74, under the name Chlorite: *see description,* p. 154. I do not doubt, now that it is observed, but that it will be found not unfrequently. The specimen was sent me as gathered near Aberdeen by a dealer without any particular observation, but I could not let it escape unnoticed here. The specimen on the whole is rather dull reddish brown.

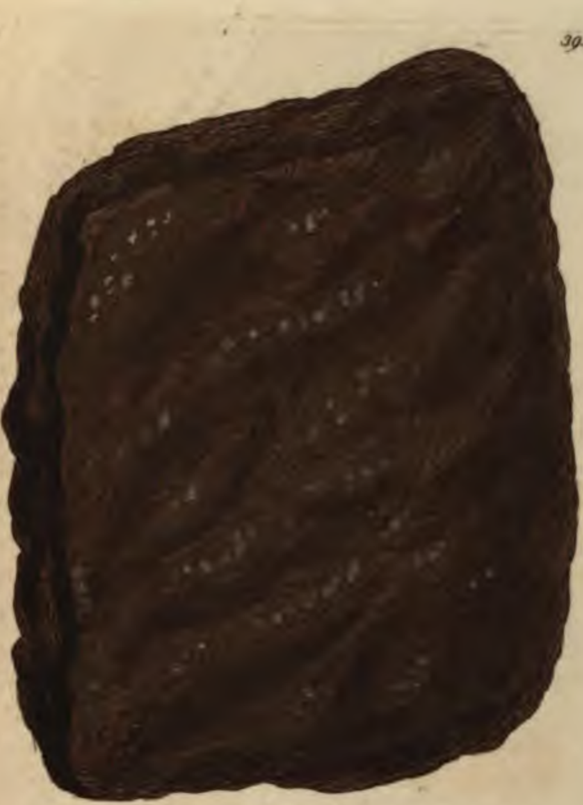
TAB. CCCXCV.

Golden Mica.

THIS is a group of almost hexaëdral laminæ, but very confused, and as it were compressed with layers of Sandy Quartz, &c. intervening. Its lustre is often so truly metallic that it is like thin plates or squamæ of Gold, nor could we represent it without metallic aid.—It is perhaps chiefly coloured by Iron Ochre.

This specimen was brought from Aberdeen, and partakes somewhat of the nature of Gneiss.

395.



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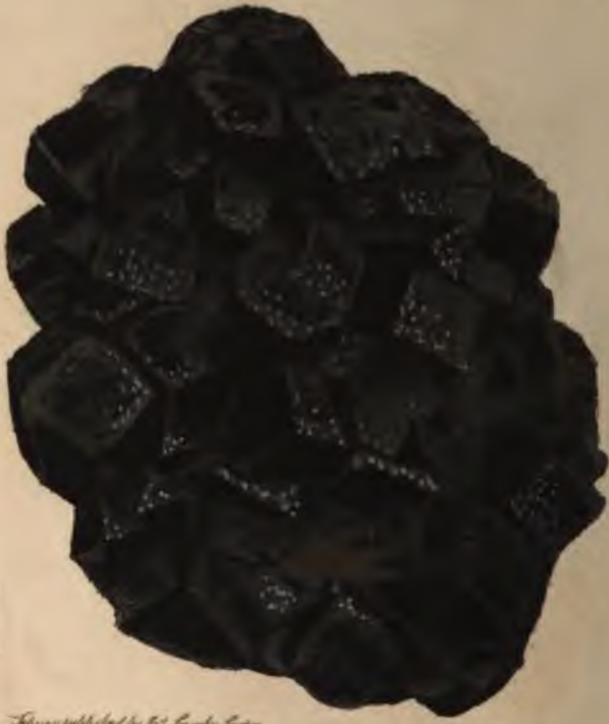

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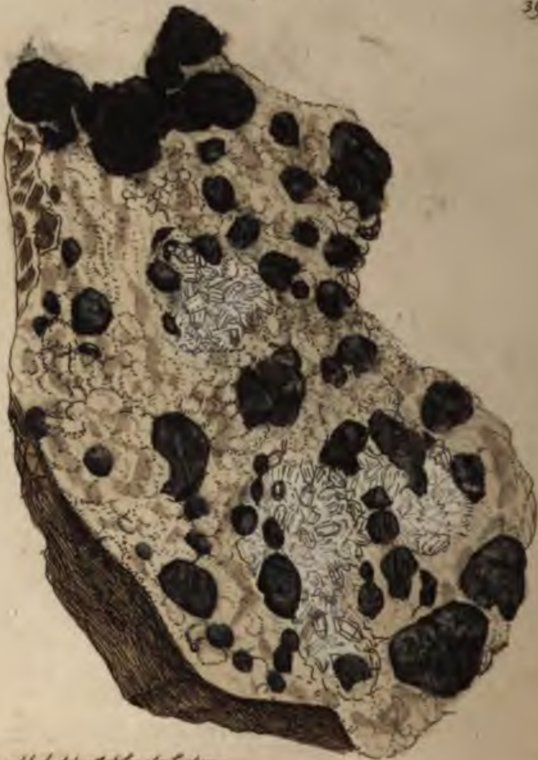

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TAB. CCCXCVI.

ZINCUM sulphureum.

Sulphuret of Zinc.

Div. 1. Crystallized. *Var.* Dodecaëdral.

This substance has so many appearances, that it is of consequence to identify some, even of the ruder-looking ones, which, after the neat examples figured in *tabs.* 74 and 75, are hardly to be recognised as belonging [illegible] the same substance. The present, however, is not [illegible] appearance of some of the massy varieties, and is representative of the primitive rhomboidal dodecaëdron, and the same as the fractured nucleus. It is altogether such a heap of small indistinct appearances, that one can scarcely recognise the parts showing what forms it belongs to; nevertheless with a little attention rugged dodecaëdrons may be observed. It exercises the early mineralogist in the study, and stands with the more experienced as an instructive lesson in the variations of Nature's school, always to be esteemed for characteristics descriptive of herself. This and the following figures serve to show the principal varieties of crystallization, which continually form more or less compounded forms and groups, that will occasionally combine so many modifications in one, that it is very difficult to comprehend them.

There are some varieties in colour (as may be seen in a slight degree), such as a fine orange brown and yellow, transparent and brilliant, but generally in small crystals. It is the resinous variety that is phosphorescent, or gives light when scraped in the dark, some say with a brass pin; but I have some by favour of Mr. Pennant, from Flintshire, that is so when scraped with a knife.

This ore is often used to procure the metal from.

TAB. CCCXCVII.

Black Jack, as this substance is commonly called by the miners, is exemplified in this specimen with the usual appearance, and is indeed black to a proverb, for I know of no substance that has a blacker aspect. Coal is perhaps even blacker when powdered, in which state Jet is brown; but this, which is full as dense and brilliant in the mass, scrapes nearly to white dust, *viz.* light yellowish brown, not much unlike rosin, which gives a whitish dust. The splendent black crystals are generally grouped as well as confusedly crystallized, showing their brilliant polished facets one at a time occasionally very distinctly, but in the group are merely jumbled masses. As they often form among white Quartz, they are the more richly relieved; and the present specimen is additionally so, by the peculiarity of some of the Quartz, which is found to be, when examined, beautifully crystallized in relieved six-sided crystals, terminated at each end by six-sided pyramids, but they are again covered by an opaque, very white, almost mealy coat; or perhaps, having been acted upon externally, have become opaque by a division of the particles, which on that account are so separable as to be scraped with a steel blade of a knife. Specimens with a thin coat of Chalcedony next to the Blende, and transparent Quartz above it, are less rare.

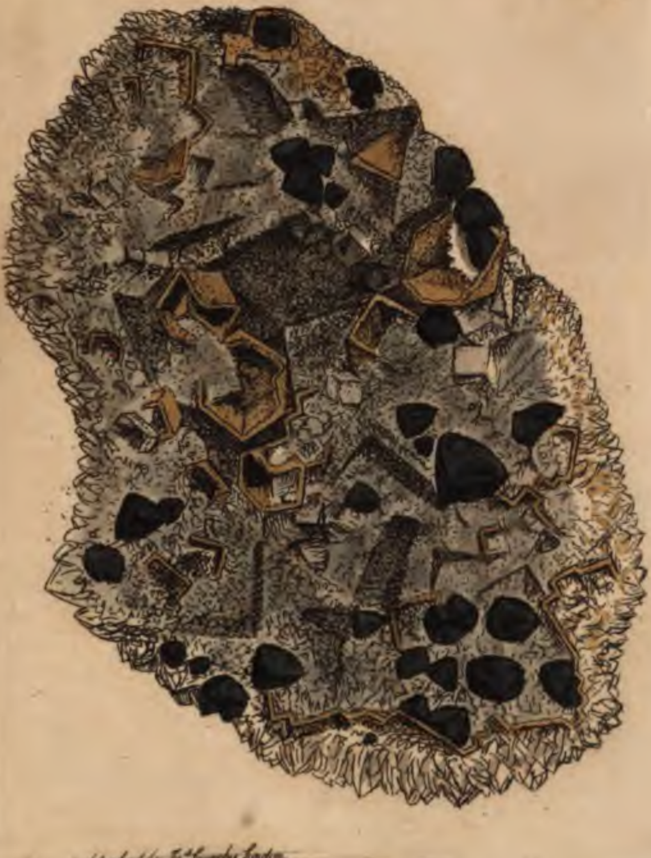
TAB. CCCXCVIII.

THE various circumstances which attend a mineral are very convenient to be known: I therefore have figured Sulphuret of Zinc in one of its usual scattered appearances, and with the seeming irregular crystallization common to it. It is in tetraëdrons, nearly as *the geometrical figure of tab.* 74, more or less formed of smaller crystals with little shining facets, or very dull, very different from those fine smooth almost steel-like polished crystals in *tab.* 397.

I chose the present specimen, as it would elucidate some other subjects if attentively considered. The matrix is chiefly Quartz, which has probably formed over Cubic Fluor, in a very loose and rough manner, as may be seen by the impression; and after the Fluor was gone, Galæna or Sulphuret of Lead has formed in a scattered manner about it. This Galæna has, however, mostly passed away, and left Brown Pearlspar in thin walls, which, having covered the cubes, are at right angles in the various positions in which the Galæna originally lay.

Thus may be seen the changes wrought underground by means of various agents; and thus we have continual proofs of chemical agency, which perhaps may lead us to inquiries that may be of considerable importance, while the subject thus come to hand is an example too curious to be passed over at a time when investigations drawn from Nature are found to be the truest mode of inquiry and improvement.

398



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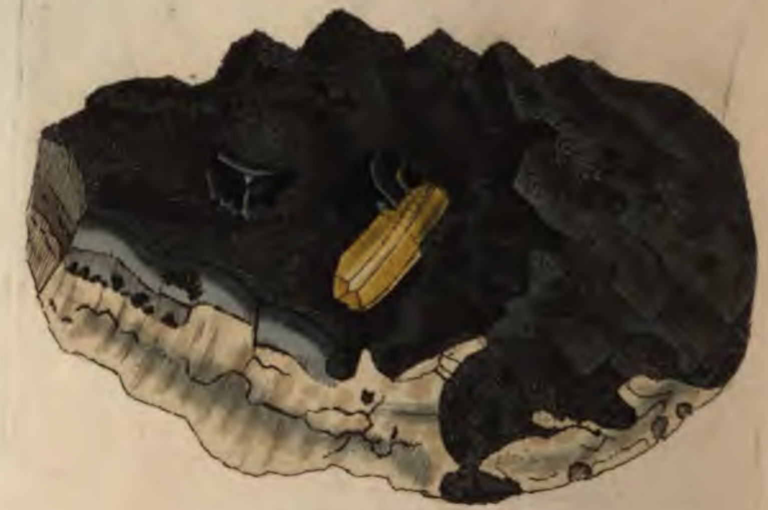
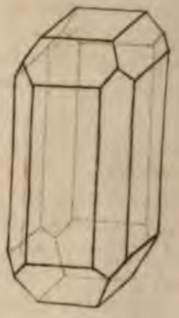
399.





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TAB. CCCXCIX.

PLUMBUM carbono-muriatum.

Carbono-muriate of Lead.

Class. 3. Metals.	*Ord.*
Gen. Lead.	*Spec.* Carbono-muriate.

SYN. A New Variety of Lead Ore. *Chenevix in Nicholson's 4to Journal.* 4. 219. *Klaproth's Analyses, vol.* 3.

I FEEL highly gratified in the opportunity of elucidating this rare substance, which does not seem to have been known to be found, excepting in this country in the neighbourhood of Cromford Level, near Matlock, Derbyshire. It was first discovered to be a new mineral by the discerning Count de Bournon, who has a primitive crystal of it, and many excellent sketches and memorandums made from our late good friend the Hon. Charles Greville's superb collection, which is now happily secured to this country in the British Museum, and from which we have selected the best specimens for these figures.

The crystal is a rectangular prism, whose planes are parallel to the nucleus, sometimes having a cubical proportion, with the angles replaced by isosceles triangular planes, the incidence of which upon the terminal face is 122°. *See the blueish figures on the left of the yellow crystal,* which look like regular cubo-octaëdrons. In these the columnar edges are a little rounded by small faces, which in some crystals are so much enlarged as almost to obliterate the primitive ones. The yellowish lengthened crystal has the first of these faces enlarged so as to form a four-sided pyramid, with only a minute vestige of the terminal primitive plane, and the edges of the prism replaced by truncating planes larger than the portion they leave of the original faces.

This substance has generally a glassy or gem-like lustre, is softer than Carbonate of Lead, which will scratch it, and with which it has been confounded. It is accompanied by small crystals of dull purplish Cubic Fluor, nearly in form of a line above them; and Galæna or Sulphuret of Lead on the right, and which is distinguished by its square appearance. The whole on opaque Sulphate of Barytes, commonly called Cawk in Derbyshire; and there are some small crystals of Carbonate of Lead scattered about it.

According to Mr. Greville, it was about the year 1785 that this curious local substance was found; and the works being discontinued, there are very few specimens known. The *outline* or *geometrical figure* explains the form of the columnar crystal, and agrees nearly with some other specimens which terminate with a flat apex.

TAB. CCCC.

This figure is taken from another crystal in the same collection as the last. It is a short prism, and shows the primitive faces by the parallelism of the conspicuous flaws or fractures. It has also two additional faces on the columnar edges, at 153° 30′ with the primitive.

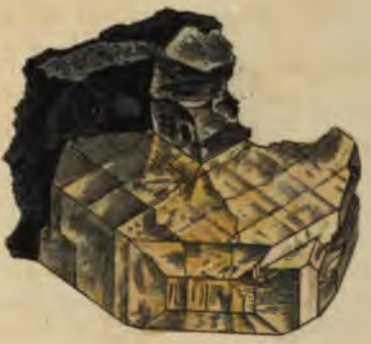
One of the specimens in the same collection has very thin tabular crystals similarly modified, set edgewise, and forming a group about three quarters of an inch in diameter.

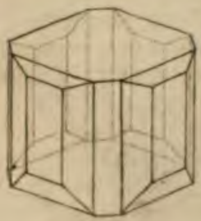
The geometrical figure shows them with a more lengthened column, forming sixteen columnar faces, besides the eight faces which belong to the octaëdron of the whole, with the two ends being regular, and forming a polyedron of 26 faces: there are two of the truncated cubical crystals accompanying this.

	Analysis by Chenevix.		By Klaproth.
Muriatic Acid	8	. . . . . .	8·50
Carbonic Acid	6	with a little water	6·
Oxide of Lead	85	. . . . .	85·50
	99		100·00

Spec. Grav: 60·651.

400.





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12	10	*for* mamillated, *read* mammillated.
17	2	*for* Carbon, *read* Carbo.
22	penult.	*for* pith, *read* pitch.
32	ult.	*for* Rashley, *read* Rashleigh.
56	5 & 6	*from the bottom, for* "myself, by favour of Mr. W. Morel, being detached," *read* "my specimen by favour of W. Morel, Esq. was detached."
63	12	*for* siliceous, *read* silicious.
69	2	*for* oxygenatum, *read* oxygenizatum.
108	1	*for* tetrahedron, *read* tetraedron.
111	6	*for* hexangular, *read* hexaëdral.
—	25	*for* sulphuretted, *read* sulphureted.
118	4 & 5	*from the bottom, dele* the parentheses.
121	12	*for* dingey, *read* dingy.
127	3	*for* siliceous, *read* silicious.
163	2	*for* Silex electricus, *read* Argilla electrica.

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